

Linguistic Typology, Universality and the Realism of Reconstruction

Frederick W. Schwink

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Number Twelve

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Für Ulrike

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Preface and Apology

This study is set up in three major parts. Chapters 1-3 comprise a unit which successively lays out the principles of language relationship & reconstruction of proto-languages, the typological approach to language study, and their integration. Chapter 4 is a concrete look at the practice behind the theory, going over a number of problems in the reconstruction of Indo-European phonology. Finally, Chapters 5-7 are an application of the method to reconstructing morphology and an examination of problems in Indo-European nominal and verbal morphology. Although originally written as a University of Texas dissertation, the readers of that version will find this incarnation of the work considerably different, esp. Chapters 2 and 5-7.

The topic of this study, "what languages really do" vs. "what we think Proto-Indo-European did" is in many ways defined by the complete body of literature on linguistics and specific languages. In the several years I have been working on this topic, I have seldom run across an article or book which was not in some way relevant. Obviously, in deciding which material to include here and in my selection of what I have read, much which could legitimately have been included is missing (thus, for example, in Chapter 7, I have confined myself to just a few theories of the Indo-European verbal system). Because this monograph is primarily concerned with the method of using typology to evaluate and guide reconstructions of proto-languages, I have not attempted so much to "solve" classic problems of Proto-Indo-European as to show how the typological framework is used, can be used, ought not be used, or should be used. If any "solution" be possible for the problems noted here, it will only be on the basis of a thorough study of texts, forms, and a completer delving into the enormous literature. To attempt such an undertaking would be paramount to writing a new Brugmann, if that is at all possible in this day and age.

I have cited few sources in languages other than German, English, French, or Dutch, these being the modern languages in which I am most fluent which also have a sizeable body of linguistic literature. I regret the selective process this implies but also wish to note that if scholars publish major works in "minor" languages, they should not be surprised if their work is passed over (cf. Adrados 1992). Although no one would advocate a return to Latin as the only language of science, the ideal of a relatively limited set of languages in scientific writings serves to keep international dialogue open and prevent the over-compartmentalization of the field. It seems that precisely the linguist should be sensitive to the need for a standard language or at least limited set of languages for scientific literature, if progress and communication are to be achieved. Further, the writers of "Einleitungen" to Indo-European linguistics do more harm than good for the field as a whole when they allow their personal shorthands to become so cryptic as to be almost unreadable or give one-sided support to specific theories while fully ignoring others. Likewise, when a (usually generative) article's bibliography contains reference after reference to unpublished

manuscripts (MIT...) or unpublished conference papers of years ago, I wonder if these writers have grasped the concept of international free scholarship (cf. Marchand 1988). Such practices are comfortable, but they make their discipline (which tends to make overly strong use of jargon; even as a native speaker of American English, I sometimes have problems following their prose) even more inaccessible and unattractive to outsiders. This is a pity, for as Anderson (1992) points out, we are all working towards a common goal, namely the understanding of language. The more linguists try to escape an Indo-Europeanist mode of linguistics, the more likely they are to find material/theory/models which will be useful in understanding Indo-European. To ignore this other work would be a pity.

For the record, if what I have attempted to illustrate here duplicates efforts in the East (or indeed elsewhere) then I am glad to relegate any due credit to the original inventor(s) of the wheel and to welcome the fact that we have arrived at similar results. If, on the other hand, their work shows mine to be in error, I can only hope they will make this known and help to set the record straight.

Some matters are stated here which to a well-versed Indo-Europeanist or theoretical linguist will seem obvious. However, for a number of readers of the manuscript who either were not theoretical linguists or Indo-Europeanists or were neither, these were precisely the things they wished to have explained. I would rather have explained a little too much as not enough, for although I don't know that I really believe in the "interested lay person" who might want to work through this study, I do believe in the "interested scholar from related disciplines" and have encountered many of them who very much want to learn more about this topic.

There should now come the traditional note to thank each and every person who has contributed to this study in any way whatsoever. However, to do that would increase the size of this preface quite out of proportion. Therefore, I will be somewhat selective here as well. My heartiest thanks go to all who have read various versions of the manuscript or discussed with me theoretical problems in reconstructing proto-languages, esp. Julie Bellquist, Dorothy Chun, Bridget Drinka, Robert King, Winfred Lehmann, Tom Palaima, John Weinstock, Carlo de Simone, Chris Stevens, as well as Brigitte Bauer, Edgar Polomé, and my devil's advocate: Joe Salmons. Especially these last three have given me so many useful comments and suggestions that a footnote for each one would have overloaded my computer. Much as I would like to spread the blame, I have to debit any errors, omissions, or inaccuracies from my own account and credit much of what is good to theirs. Winfred Lehmann & Thomas Gamkrelidze passed on valuable literature to me and I thank them for that. Heinrich Hettrich and Sabine Ziegler gave me welcome use of the facilities of the Seminarbibliothek in Würzburg. Without the generous financial and moral support of Ronald and Marion DeFord, Thomas M. Schwink, Rekkenze Brass, and Ulrike Frieß, this manuscript would never have been completed. And finally, thanks to you Ulrike: you didn't read or type it, but you made me *finish* the confounded thing!

Chapter 1 Relationship and Reconstruction

In an attempt to compare competing representations, a tendency to rely on simplicity and elegance has emerged. The tests of value in linguistics have tended to become aesthetic tests, on a par with the tests of literary or artistic merit. This is surprising for a discipline which aspires to the state of a science. Not that science is unaesthetic. It exhibits a full measure of simplicity and elegance. But the tests for truth in science are quite different.

(Yngve 1969:456)

1.0 Introduction

The statement that two or more languages are related to each other is based on assumptions about the nature of linguistic signs and the way human language develops. It assumes a historical way of looking at language which in turn implies a way or ways of describing historical states and events. Since the second half of the 19th century, a method has been developed which attempts by means of a so-called proto-language to recapture stages of languages before the advent of writing. In this chapter, I will sketch the important kinds of relationships in language, methods of reconstructing proto-languages, and their implications.

2.0 Relationship in Language

In their recent *Einführung in die vergleichende Sprachwissenschaft* (1989), Sternemann & Gutschmidt deal with three types of relatedness in language (cf. also Lehmann 1992):

genetic - similarity due to shared ancestor

areal - similarity due to contact

typological - similarity due to common patterns going beyond genetic or areal origin

One may further mention similarity due to sheer coincidence. In the following I will discuss these types of relationship, although the main emphasis of this study will be on genetic relationship. Nonetheless, to understand fully the nature of genetic relationships, one must take typological and areal factors into account.

2.1 Genetic Relationship

A variety of languages are considered to be genetically related because of enough regular agreement in elements of *signifié* and *signifiant* to preclude the workings of coincidence (cf. Thieme 1964:568; Untermann 1985; Croft *et al.* 1990:xi). The relationship of sign to meaning is for the most part arbitrary. Exceptions to this precept include onomatopoeic vocabulary etc. If these exceptions as well as borrowed material are eliminated and two or more languages still show a high degree of *regular* agreement in their signs, i.e. homomorphism, then the nature of the linguistic sign rules out mere chance. The number of

homomorphisms should be significantly high and one should be able to quantify this significance (Job 1982:48-9). Ringe (1992) has recently carried out a study which does this by quantifying the amount of phonological similarity which is statistically relevant in determining a genetic relationship. Ringe's method is extremely important for the discussion of distant relationships, however, no one would deny that the degree of homomorphism in the Indo-European languages is more than high enough to assume intuitively a genetic relationship.

2.1.1 Near Relationship

A distinction is often made between near and distant relationships in languages. The Indo-European languages, for example, are considered to be very closely related, although the precise nature of the relationships is hotly disputed. For example, since the discovery by Hrozný in 1917 (cf. Arens 1969:461ff.) that Hittite was an Indo-European language, a debate has flourished on whether it is an archaic offshoot of Indo-European, a daughter language of a pre-Indo-European language, a language which at some time came into close convergence with unrelated Indo-European, or an extremely innovative offshoot of Indo-European (cf. Schlerath for a discussion, 1981:183-4; Adrados 1992; my Chapter 7). Similarly, the Bantu, Semitic, or Finno-Ugric language families are generally accepted as valid objects of comparative study despite controversy as to precise inner-group relationships. It is assumed that each of these language families is descended from some prior language which broke up into the various daughters within a few millennia of their attestation.

2.1.2 Distant Relationship

For Indo-Europeanists, there are two kinds of distant relationship which have attracted much attention: Nostratic and "Proto-World" with its various manifestations. At the beginning of the 20th century, Pedersen, Cuny, Möller and others variously compared Proto-Indo-European and its reconstructions with Proto-Semitic and other language families. Pedersen (cf. Pedersen 1931:338) coined the term "Nostratic" to describe this macro-family. Sternemann & Gutschmidt (1989:190-198) give a concise description of current work on Nostratic (cf. also the collection of articles in Sheveroshkin & Markey 1986). The Nostraticists find themselves in a somewhat better position than Greenberg (cf. directly below), for their languages are better attested and have a good history of comparative research within the respective language families so that, regardless of its use in Nostratics, valuable work has been done on Proto-Semitic, Proto-Uralic, etc. The Moscow school has attempted to introduce philological rigor into its comparison and reconstruction. My own judgment is guarded, for given the problems of even Proto-Indo-European, I fail to see how much more than loose sets of correspondences can be established for Nostratic (cf. for example Chapter 4 on the conflicting vowel systems proposed for Proto-Indo-European). However, I do not believe that an outright rejection of the approach does justice to possible results (cf. Sternemann & Gutschmidt 1989:198). Unless one projects the genesis of

language *per se* into the period of Indo-European the possibility of earlier break-ups of language groups must be admitted. Even if Proto-Indo-European existed at some time as a fairly uniform language system and community, there may have been neighboring languages which shared the same degree of relationship to it as one now sees between, e.g., Germanic and Indic. The fundamental question is not so much whether a Nostratic might have existed as whether it can be recovered to any appreciable degree.

Because of the continual process of language change, the original clear patterns of relationships can be so obscured by the passage of time as to be unrecognizable. Nonetheless, numerous scholars have attempted to establish distant language relationships going far beyond Nostratic. In the last few years, the American popular press has seized on the work of comparativists of distant relationships with articles in *US News & World Report*, *Scientific American*, and *Atlantic Monthly*. Probably the most notorious attempt at macro- or megalocomparison has been by Greenberg who recently has tried to show that all the indigenous American languages except Eskimo-Aleut and Na-Dene belong to one macro-family (cf. Matisoff 1990 and Greenberg 1991). Although most comparatists reject Greenberg, I would like to cite at some length a recent exposition of the approach and then rebut the arguments (cf. Watkins 1991). This is done not so much because I think the approach is significant as because it has been taken far too seriously and I have personally had any number of non-comparatists defend it to me. As study of Ringe (1992) will show, these extensive multilateral comparisons must be rejected.

Ruhlen (1987:122ff.) has defended Greenberg's methodology on a number of grounds:

- 1.) Ruhlen considers the call for regular sound correspondence as a proof of genetic relationship fallacious. He claims that the regularity of sound correspondence is not a prerequisite for recognition of genetic relationship, but rather results from recognition of the same.
- 2.) Regularity of sound correspondence may be expected in closely related languages but not in more ancient groupings. "What Greenberg's work on genetic classification demonstrates quite clearly is that even after correspondences have been eroded to the point of invisibility, it is still often possible to identify sufficient cognates so that the genetic unity of a group is not in doubt" (p.123).
- 3.) Sound correspondences are not without exception even at lower levels of relationship.
- 4.) Sound laws also affect loanwords.
- 5.) "it is worth remarking that there is no analog to sound correspondences in biological classification, which is nonetheless recognized as being in a more advanced state than linguistic classification" (p. 123).¹

¹Ruhlen refers here to the system of biological nomenclature as a metalinguistic system, not to correlations of language and genetics as found in the works of Cavalli-Sforza.

RECONSTRUCTION & TYPOLOGY

4

In response to Ruhlen I would like to note the following points:

- 1.) Whereas the relationship of the Indo-European languages was indeed recognized before the concept of sound law was conceived, nonetheless, the general regularity of sound correspondence in semantically related spheres was recognized and the more rigorous Neogrammarian sound laws confirmed the conclusions already reached. The correspondences *did* exist. As Ringe (1992) notes, almost any random set of languages will show some similarity, in part due to the limited repertoire of sounds which humans are capable of producing. For determining relationships, the similarities *must* be proven to be more than coincidental.
- 2.) If correspondences of sound "erode" to the point of "invisibility", then how is one to find them at all? Until Ruhlen and others can recover the patterns of regularity, they have already admitted their absence. It is not denied that there may have been larger language groups in more ancient times than as yet recovered, but Greenberg and Ruhlen do not provide the means to prove a language belonged to the ancient grouping or, more importantly, did not.
- 3.) Numerous factors affect the regularity of sound laws: borrowing, frequency of use, analogy, dialect mixture, lexical diffusion, etc. However, these factors may be described and the data explained. As Lehmann puts it (1992:17): "There is no alternative to assembling and arranging linguistic data before proposing explanations."
- 4.) Saying that loan words are often adapted to the structure of the borrowing languages is nothing new and merely shows that great care must be taken in looking at the patterns of native and borrowed words. Sometimes, as in Armenian and Iranian, there may be no way to state definitively whether an Armenian word is native or borrowed from Iranian, but one must be willing to point out this impossibility and accept it as such.
- 5.) Linguistic and biological classifications are not comparable except as metalinguistic procedures of taxonomizing. It is up to Ruhlen to show that they are on a similar level and should be compared.

A major objection to macro-comparison is that time has reduced the usefulness of the data to such an extent as to destroy any basis for a reasonable comparison. Further, in macro-comparison of many languages, researchers have tended to treat the data in a cavalier manner, ignoring distinctions of borrowing and chronological layers (cf. Matisoff 1990; Salmons 1992b). The standards become so lax that almost any language can be added to the macro-family.² One may also think of Nikolaj Jakovlevič Marr (1865-1934) in this context. His views on a universal mono-genesis of language were seized upon by Stalin for ideological reasons and warped the development of Soviet linguistics for decades (cf. Thomas 1957; Borbé 1974).

² Then called Proto-World, Proto-Man, or following others, Proto-Woman: cf. attempt to trace all languages of the world back to one language with but six words, four of which mean 'woman!' (Fester 1979). Most of such work is founded on false data, incorrect use of data, and circular reasoning as discussed by Doerfer 1973. Nonetheless, it remains extremely popular on the fringe.

2.2 Areal Relationship and Convergence

Trubetzkoy (1968[1939]) proposed that the Indo-European language group was not necessarily descended from one single proto-language which had come into contact with other language groups and developed over the course of time. Instead the "daughter" languages might be unrelated and had converged during some prehistoric period of close contact (cf. Morgenroth 1988). Trubetzkoy (1968[1939]:219) suggests that relationship in language is relative. In addition to the material agreements, Indo-European is defined as a bundling of 6 typological characteristics (p. 217). In his view a language can become Indo-European or become non-Indo-European. Analogous convergences have been adduced from India and the Balkans (although there the languages that converged were ultimately related). The main difficulty with Trubetzkoy's view is the high degree of systematic and formal agreement in Indo-European languages. Further, the only historically attested cases of such a high degree of convergence (e.g. Koine Greek) have been for dialects which are closely related to begin with. Thomason & Kaufman (1988) show that even in very close contact situations, the genetic affiliation of a language does not change.

2.3 Typological Relationship

Although a multitude of possibilities exist for the strategies languages use to achieve their functional goals, fewer such strategies are used than are theoretically possible. Thus, for example, one may speak of that group of languages which is head marking vs. that which is dependent marking; or SVO and SOV languages may be distinguished. This kind of classification puts together languages from around the world which may or may not have any history of genetic or areal relationship, yet share common structural patterns. Chapter 2 will be devoted to a description and definition of typology.

2.4 Coincidence

Even if two or more languages are genetically related and/or have been in contact at some later stage in development, one cannot dismiss the role of coincidence which may lead languages to share idiosyncratic features, for example, Farsi *bad* 'bad' and English *bad*. Matisoff (1990) in a review of megalocomparisons by Greenberg gives a list of such coincidental similarities (cf. also Turner 1976:210-211). Ringe's monograph (1992) offers a concrete method of calculating the probability of coincidental similarities.

3.0 Reconstruction

Linguistic reconstruction is the building of a proto-language³ from attested languages, which have been judged to be genetically related to one

³Following Marchand (1973), the prefixes *proto-*, *pre-*, and *common* may be distinguished. *Proto-* refers to what is proposed as belonging to the original language that one is trying to

another. The main methods by which proto-languages are reconstructed, comparative and internal, are laid out by Meillet (1925), Kuryłowicz (1964b, 1973), Hoenigswald (1960, 1963, 1973), Birnbaum (1977), and others and for the most part date back to the later 19th century (cf. Thieme 1964). The recent article collections of Baldi (1990 & 1991) show that interest in reconstruction and its interpretation is very much a going concern.

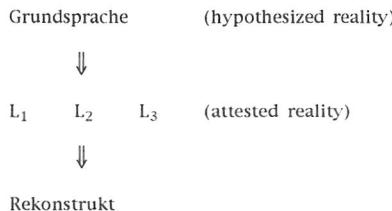
Comparative reconstruction comes, as the name implies, from comparing *languages* whereas internal reconstruction looks at *one language*. Although these two types of reconstruction are qualitatively different, they rarely occur in isolation. Most reconstructive work makes liberal use of both methods.

Neither method is superior to the other; rather, they complement each other. Internal reconstruction prepares the individual language's database for input into a comparative reconstruction (Beekes 1990:134-5). This does not imply a temporal priority in discovery of language relationships. Instead, it suggests that in refining a reconstruction, the findings of internal reconstruction have explanatory priority.

Tichy (1990:8-9) defines the following five steps for reconstruction:

- 1.) Collect material.
 - 2.) Analyze material within individual languages' developmental tendencies and set up temporal levels.
 - 3.) Set up proto-forms from which all descendants can be derived.
 - 4.) Determine the synchronic state of the reconstruction, its inventories and rules.
 - 5.) Trace the development of the proto-forms and systems back up to the daughter languages.

Gusmani (1989) describes the process of reconstruction in the following terms (cf. §4.0):



reconstruct, *pre-*, to any stage in reference to a later stage, and *common* only to features which are in common for any two or more stages of languages or dialects, without reference to ultimate origin or relationship of the features. Anttila (1989:274) notes that *pre-forms* are produced by internal reconstruction, *proto-forms* by the comparative method. One could presumably make a terminological distinction between, e.g., *pre-Indo-European* and *Pre-Indo-European*, but I know of no one who does. I use Proto-Indo-European and Indo-European more or less interchangeably.



Erklärungsmodell

The reconstructive process goes from individual elements to systems. For example, in reconstructing an Indo-European **p*- by comparing the various words for 'father', only one disconnected fact has been identified. However, once patterns such as **p t k* and *(*b*) *d g* have been found, it is possible to speak of the consonantal system of Proto-Indo-European. The reconstruction of the phonological system goes hand in hand with the reconstruction of grammar, semantics, and lexicon of the language. Through understanding of phonological correspondences, the common patterns of morphology, semantics, etc. can also be recovered to a greater or lesser degree (cf. Hall 1974). The step by step building up of systems from elements reflects in part the history of reconstruction from the neogrammarians with their more atomistic reconstruction of sounds and then words to later scholars' attempts to find the systems beyond and it reflects the relative coherence and cohesiveness of the areas involved. Grammars of Indo-European generally examine the following areas: phonological inventory and its later development, morphology of the noun and verb, and the lexicon; but they give syntax short shrift. Lehmann (1974b:623) claims that earlier reconstruction was only concerned with a "non-central segment of language", namely phonology and some morphology, but as he put it recently: "A syntactic framework is gradually being assembled, if over bodies of reluctant Indo-Europeanists; it will be followed by frameworks for discourse, semantics and pragmatics" (1992:8; cf. however also Winter 1984).

Of course, the borders between syntax and morphology may be vague and dependent on changing definitions of whoever is writing (cf. my discussion in Chapter 5). Thus, for example, Lehmann's *Proto-Indo-European Syntax* (1974a), while especially interested in word order typology, is also concerned with inflection, whereas Krahe's *Grundzüge der vergleichenden Syntax der indogermanischen Sprachen* (1972) looks more to semantics, keeping in an older syntactic tradition.

Although the lexicon comprises a large segment of what is reconstructed, the precise semantics of this lexicon is notoriously difficult to recover. Although Benveniste (1954) has attempted to set up a methodology of reconstructing meanings, he fails to set up a convincing and rigorous model. Reliable semantic reconstruction would be of special importance for reconstructing proto-culture. Sternemann & Gutschmidt (1989:54-57) state that it is probably impossible to sort out primary and secondary meanings except in a few word fields such as kinship terms which are remarkably stable. Sweetser (1990) offers some valuable insights into the typology of semantic change, raising hopes that it may become possible to sort out more than was previously workable.

A particular obstacle to reconstructing a proto-language is the loss of categories or features. It seems, for example, that more marked categories are most easily lost and least amenable to reconstruction. (cf., e.g., dual forms in Beekes 1990). If, as Lüdtke (1989:135) claims, one cannot reconstruct what has been lost in all daughter languages, then a reconstruction must remain an incomplete picture of the proto-language (Hock 1991:586). Although a reconstruction will always be to a certain extent reductionist, the claim that lost stages are irretrievable will be shown in this study to be only conditionally true.

The methods of reconstruction have also been applied to language groups which have almost no history of attestation, e.g., for Proto-Bantu, which has little time-depth attested except for ki-Kongo and Swahili to a limited extent. Pulgram feels that the reconstruction of languages with little depth of attestation is questionable (1961:32). Haas (1966) disagrees, stating that any group of related languages can be used for reconstruction, although the relative accuracy of the reconstruction may suffer when there is little time-depth of attestation. The basic problem in reconstructing languages where there is little time depth in the daughter languages' attestation, is that the general developmental tendencies of the daughter languages may have been irrevocably lost. Clearly, the degree of reconstructibility of languages with little depth of attestation will also depend on their degree of conservatism. In the Bantu languages, for example, the shared morphological patterns are quite transparent (class system with its recurrent class prefixes which are partly conditioned by semantics; cf. Corbett 1991). As the articles in Baldi (1990, 1991) show, there is much which can be done in reconstructing non-Indo-European proto-languages with little depth of attestation; however, there are also limitations.

More serious is the claim that the kinds of change found in Indo-European are not characteristic for other language families (Boretzky 1984; Mühlhäusler 1989:141; Blust 1991). However, the idea that, e.g., special religious, taboo, social, or ecological factors may play a major role in the way languages develop has never been denied; the question is rather, in what ways these factors interact among related languages and how to recognize them (cf. Hoenigswald 1991). Nichols (1992:269) has claimed that head marking languages are characterized by affixal pronouns, monophonemic roots, lack of citation forms, and bound inalienable possession. These characteristics will conspire to destroy the kind of evidence which the comparative method uses to establish relationship. She states: "For an area with many head marking languages like the New World, claims for deep relatedness should be received with more tolerance than would be appropriate, for example, for a claim that some language was related to Indo-European" (1992:269). Here I believe an important distinction could be missed. Nichols has claimed that head marking languages may lose the material which proves relatedness more quickly than dependent marking languages like Indo-European which have been so influential on the development of the comparative method. She uses this fact to attack the general applicability of the comparative method. In fact, it is only a demonstration that head marking languages are more likely to

develop more quickly to a state of mutual unrelatedness (or one of unprovable relatedness, which is in effect the same thing). Whereas one may assume a deep relationship as a *Gedankenexperiment*, the proof has disappeared.

3.1 The Comparative Method

Let us now proceed to the nuts and bolts of reconstruction. Winter (1970:149) describes the comparative method in the following terms. First one carries out "inspection". This is looking at a number of languages for "a sufficient number of apparently recurrent correspondences". One should look at the oldest stages of languages, judge which language have the most archaic features or residues (Lehmann 1990). Inspection is followed by "sorting" which involves a complete listing of the correspondences discovered although without interpretation (Winter 1970:149). Thereafter comes the reduction of the material to major correspondence classes. If there are irregularities in distribution, one looks for specific factors which may condition the difference. This is now an interpretive procedure. The label chosen for an entity of a major correspondence class should have "a maximum of similarity with the items labeled" (p. 152). In this selection, the question of archaicity of daughter languages will be taken into account. After the assumption that the label represents some earlier stage of the languages being looked at, an attempt may be made to look at the labels as parts of systems.

The comparative method does not produce temporal distinctions (Sternemann & Gutschmidt 1989:219). It produces a proto-language which is a potpourri of features. It will be the job of internal analysis to sort out this proto-language.

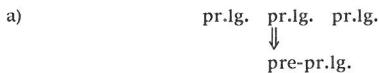
3.2 Internal Reconstruction

Internal reconstruction looks especially at the irregularities of synchronic language states and assumes that irregularities and exceptions to otherwise clear structural patterns may be more archaic and can be explained from more regular pre-states (cf. Kuryłowicz 1964b, 1973; Hock 1991:533; Anttila 1989:274; Sternemann & Gutschmidt 1989:214ff.; Beekes 1990:134-5). The general principle invoked is that languages tend towards regularity. If, for example, developments in phonology destroy morphological regularity, it will be reestablished by a systematic overhaul of the grammar (cf. Wurzel 1985). Internal reconstruction is applied both to attested languages and proto-languages. However, the application of the internal method to proto-languages is not without dispute. At issue is the question whether a proto-language properly represents a synchronic state of a language. If not, then internal reconstruction from proto-languages is logically impossible. As will be seen in the course of this study, such a view of a proto-language is only conditionally correct; and the internal method can be applied with rewarding results to a proto-language.

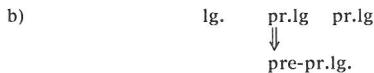
3.3 Stage Models and Pre-Proto-Languages

Just as the comparative and internal methods are used for attested languages to create proto-languages, so also these methods can be applied to a proto-language (or to proto-languages) to achieve stages or preproto-languages (cf. Winter 1984:617).

Comparative reconstruction to create a preproto-language takes as its input sets of proto-languages or languages with proto-languages. This sort of reconstruction has been carried out to produce Nostratic, but also to further clarify the development of Proto-Indo-European. The process can be schematized (pr.lg. = proto-language; lg. = language):



or



For example, early scholars such as Junius (1665), Hickes (1705), and ten Kate (1710) recognized that the Germanic languages were related; and ten Kate even described them in terms of their common grammatical systems. Similarly, Lluyd (1707) recognized the relatedness of the Celtic languages although he did not reach such a high stage of synthesis in his analysis as ten Kate. Ignoring what is known about the broader relationships to, e.g., Indic, one can reconstruct a Proto-Germanic or Proto-Celtic. Comparison of Proto-Germanic with Proto-Greek, Proto-Indo-Iranian etc. can produce a Proto-Indo-European (i.e. Scheme a). In practice, the reconstruction of a proto-language from related proto-languages is done with much reference also to the actually attested languages (i.e. Scheme b).

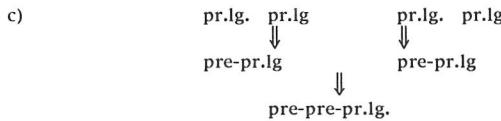
A "pure" reconstruction of a subproto-language may ignore vital information. If, for example, one reconstructs Proto-Germanic without reference to Indo-European, then even if variations in the verbal paradigms allow the partial internal reconstruction of accent (i.e. because of Verner's law), the accent will still be irrecoverable for a word such as *p̥atér 'father',⁴ for which there is no referent to show that the dental is suffixal and related to the dental in other kinship terms.

A variation on this approach is possible if a determination of relative affinity of several language groups shows that several proto-languages are closer to each other than to one or more other proto-languages; then a reconstruction of an intermediate proto-language for just the more closely related group becomes possible:

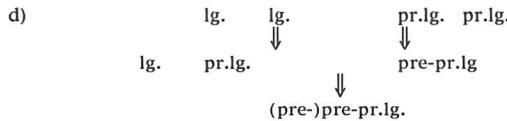
⁴Whether the first vocalic element is schwa or a laryngeal is at this point irrelevant for my argument.

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or even



Obviously, one can play about with such schemes *ad infinitum*. However, the determination of subgroupings is quite difficult. The basis of relationship may be no more than a small set of correspondences (cf. Lehmann 1974b:623). If no realism is intended, nothing stands in the way of constructing such proto-languages. In practice, however, such reconstruction of stages is based on assumptions about the subdivision of a proto-language (*Ausgliederung*). For example, if Proto-Hellenic and Proto-Indo-Iranian are more closely related to each other than to Proto-Anatolian, then one can reconstruct a Proto-Indo-Hellenic (this is in essence what will be discussed in Chapter 7 as "traditional" Proto-Indo-European) and then Proto-Indo-European. This possibility is at the core of Sturtevant's attempts to explain Anatolian as an earlier offshoot of "Indo-Hittite" which evolved into Proto-Indo-European. Although Indo-Hittite has been declared dead, it arises again and again under different guises and cannot be laid to rest until the status of Indo-European *Ausgliederung* is settled.

If a reconstruction of a proto-language is assumed to achieve a synchronic state, then the principles of internal reconstruction may be applied to it as to an attested language. As noted above, in internal reconstruction one looks at the anomalous structures in a language system and extrapolates a chain of events which might have led to their introduction. If a reconstruction of a proto-language by the traditional means produces an anomalous system one may either attempt to revise the system to make it come into line with what statistical studies tell us about languages (more on this in Chapter 3), or suggest reasons for the unusualness of the system and propose different pre-stages that have acted to create the unusual system (cf. Gamkrelidze 1989). A system may be unusual in two different ways which have a bearing on the recovery of earlier stages of a language. First, the system may be unusual and unstable. Then some earlier system must be assumed which has been thrown off balance. Second, the system may be unusual and yet stable. This is the instance when a change in one linguistic subsystem affects a change in another in such a way that a previously motivated pattern has been shifted into an unmotivated one that is nonetheless

stable. Cf. here the reconstruction of Proto-Indo-European accent and Ablaut or the consonant cooccurrence restrictions of the Proto-Indo-European root in light of the Glottalic Theory (Chapter 4, §3.1.4).

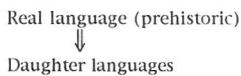
A proto-language which is the result of comparative and internal reconstruction will be artificially regular. Further, it will be a partial system, as no language can be completely recovered. The preproto-language takes this a step further, becoming even less complete (Seibold 1976-7). Stage features have been proposed for Indo-European with reference to velars, gender, case system, nominal word derivation, the Glottalic Theory, formation of the optative & conjunctive, and basic color terminology (Tischler 1989). An *Erklärungsmodell* of a language is systematically coherent so that the individual components become more and more regular as one works back (Gusmani 1989:75-6). The danger exists that as you work your way further and further from attested languages, the reduction of material and its systematization will tend towards a set of common denominators. This might mislead researchers into assuming structural and genetic relationships which are only the result of the system's limitations.

4.0 Status of Reconstructed Proto-Languages

In the above sections I have shown how genetic relationship may be determined and then sketched the methods used to bring the related material to a common denominator (i.e. a proto-language). The question must now be raised, just what the status of a proto-language which was constructed using comparative and internal methods will be. By describing the process of reconstructing a proto-language with comparative and internal methods, I have to a certain extent jumped ahead of myself. Internal reconstruction is carried out using rules and expectations about the way that languages work; however, can one equate the product of a comparative reconstruction with real language? Two answers suggest themselves:

- 1.) The proto-language is a formula
- 2.) The proto-language is a language

If we recall Gusmani's sketch of how reconstruction is carried out, we see the elements (1989):



This is a description of assumed reality, although the existence of the prehistoric language is based on the assumption of genetic relationship of the daughter languages as discussed above §§2.1ff.

Daughter languages

↓
Formula of correspondences (= proto-language)

This second diagram represents the construction of the proto-language using the data of the daughter languages. At this stage of analysis it is unquestionably a formula. Calling the proto-language anything else is wishful thinking (cf. discussions by Schlerath 1981 etc.; Dunkel 1981; Bynon 1983a:71; Zimmer 1988; Koerner 1989; Gusmani 1989). That this is so was recognized early on. In an older handbook one reads:

"Auch betrachtet man die erschlossenen Grundformen heutzutage nicht mehr als reale Gebilde, sondern nur als Formeln, die den wechselnden Stand unseres Wissens knapp zusammenfassen sollen." (Schrijnen 1921:29).

Antoine Meillet was one of the most prominent supporters of the thesis that proto-languages are formulaic. In his *Introduction* of 1937 he makes the often quoted statement (p. 47):

"En somme, ce que fournit la méthode de la grammaire comparée n'est pas une restitution de l'indo-européen, tel qu'il a été parlé: c'est un système défini de correspondances entre des langues historiquement attestées."

A well-known anecdote has it that Meillet refused ever to pronounce one of his reconstructed forms, emphasizing thus the fact that they were only formulae. Others pronounce them while maintaining that they are not a real language (analogous to the conventional pronunciation *entre mycénologues* of, e.g., <qasire-u> as [kʷasireu] although it is known that the actual pronunciation must have been more like [gʷasileus]).⁵

This formulaic proto-language is built from the material offered by real languages and set up using knowledge of how real languages function. This means that the formula is not random, rather it contains within it propositions about how languages are thought to have developed. The use of internal reconstruction strengthens this feature of the proto-language. Thus, although the proto-language is still essentially a formula, it is a formula which tries to create a picture or a shadow of a once living language (Pulgram 1959).

A reconstruction is a formula. It may, however, be interpreted and explained. The interpretation is intended to make the formula more closely approximate the reality of the *Grundsprache*. What are the differences between a living language and a formula? If, for example, a formula is made which sets up single common denominators for various daughter reflexes, the formula will achieve a uniformity which is a result of the method, not of the reality of the object (cf. Marchand 1955:428; Pulgram 1961, 1964; Nehring 1961; Dyen 1969, 1978;

⁵Cf. also the use of <z> for the results of *ky-, *ty- and other sounds where the pronunciation is very uncertain.

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Hock 1991:568; Gusmani 1989:76; Sternemann & Gutschmidt 1989:159ff.). Unless a model of break-up for the *Grundsprache* is assumed without nodes of earlier and later separations, the formula will be a summary of information from the *Grundsprache* regardless of differentiation in time. The formula will also lack any reference to space (cf. Untermann 1985). The *Grundsprache* must have known the same types of diversity which all languages demonstrate, but the reconstruction may not capture it (cf. Pulgram 1961; Sternemann & Gutschmidt 1989:176-181).

Although a reconstruction by the comparative method is of necessity uniform, it represents a potpourri of diachronic, diastratic, diaphasic, and diatopic features and systems.⁶ By recognizing this fact, the challenge is made to devise ways of sorting out the various periods and levels (Sternemann & Gutschmidt 1989:181-190) Success may well be limited, for as Lyons points out (1968:50), even synchronic stages of languages display considerable variation and the problem of distinguishing diachronic change from synchronic variation and/or change in progress may be extremely difficult, if not even often impossible. Yet, the challenge remains and the limitations are not clearly defined.

The process of sorting out stages and forms of a proto-language is comparable to the reconstruction of a proto-text from a diverse manuscript tradition and defining the lines of transmission, a process perfected by 19th century philology (cf. Hill 1966:2). However, the originator of linguistic reconstruction, August Schleicher, was well acquainted with the concept of manuscript families and their construction, yet never used the concept in his writings (Benware 1974:68). Koerner (1990:187) explicitly rejects a relationship between Schleicher's tree and manuscript stemmata.

One way to avoid at least some of the problems of uniformity implicit in the formula lies in the assumption that the proto-language from which the Indo-European languages are descended was spoken by a small, homogeneous community so that the problem of dialectal divisions is eliminated although the sorting out of diachronic stages remains. (cf. Dyen 1969, 1978).

Are all parts of a reconstruction equally good or likely to approximate reality? The larger the number of variables in a linguistic system and the less strict the rules or patterns of the system, the less able we are to turn the clock back for that part of a proto-language. In §3.0 it was noted that for Indo-European only some linguistic subsystems are commonly reconstructed. These systems are those with the smallest number of elements and the strictest sets of rules; first and foremost is phonology while syntax and semantics lag behind. Winter (1984) suggests that "learned" linguistic knowledge is more reconstructible than "rule" knowledge. There is an interesting demonstration of this scale of reconstructibility in Hall's reconstructions of Proto-Romance (1950, 1960, 1974). Hall indicates the relative success in reconstruction to known structures in

⁶Diaphasic, diastratic, and diatopic are terms used to refer to dichotomies of language for a speaker, across social levels, and across geographic spread, respectively (for a larger set of distinctions cf. also Marchand 1988:95).

Romance as 95% in phonology, 80% in morphology, 70% in syntax, and 80% or more in basic vocabulary (1974:17; cf. Szemerényi 1990), although he does not indicate how and where he arrives at these figures. He suggests the implication that a Proto-Indo-European reconstruction may be similarly successful. As the famous discovery of laryngeals in Hittite or labiovelars in Linear B have shown, there has been considerable success in capturing some unattested phonological elements of language structure by reconstruction.⁷ Morpurgo Davies (1990) has examined a similar type of reconstruction, that of Proto-Arcado-Cypriot, and compared it with attested Mycenaean Greek. Pattanayak (1966) reconstructs back from Oriya, Assamese, Bengali, and Hindi. Bynon (1983b) attempts syntactic reconstruction using Modern English and Modern German and emphasizes the lack of and need for such controlled experiments to help understand the possibilities and limitations of reconstruction in general (p. 244).

5.0 Realism & Uniformitarianism

If a reconstruction is attempted which is as close as possible to the real proto-language, then demands of probability and plausibility will have to be brought to bear on the process of reconstruction. Real languages are not algebraic formulae, although such formulae may be and have been used in their description, cf. the 19th century reconstruction of a Proto-Indo-European *a₁, *a₂, *a₃ (Thieme 1964:588).⁸ A reconstruction must fit as closely as possible to known limitations of language, unless one contends that language has changed in essence over the last few thousand years. A proto-language should display those features which all languages have, unless there is a good explanation for their absence, for example, that there aren't sufficient data to reconstruct one or another part of the language (cf. Hock 1991:571). This statement is not meant to imply the possibility of a reconstruction that is as complete as, e.g., a Duden

⁷Actually, the term "labiovelar" may be inaccurate for the state of affairs in Mycenaean. What is transcribed as *q-* for Mycenaean is something corresponding to velars or labiovelars in other Indo-European dialects and to various reflexes in Greek, depending on the following phonological environment. The exact quality of the sound represented in Linear B is uncertain. It is, however, distinguished from what later is reflected as *k-* etc. The labiovelar signs may alternate with digraphs, <*qo*> vs. <*ku-wɔ*> which would suggest either *kw* or *kʷ*.

⁸Proto-Indo-European *e *a *o all fell together in Indo-Iranian. This group of languages was assumed to preserve the most purely the proto-language's features, although the other daughter languages could not be explained from Indo-Iranian. The numerical notation preceded the recognition that in this instance, Indo-Iranian had innovated. This notation of Proto-Indo-European vowels is reminiscent of Hyman's 1970 attempt to explain palatalization and labialization before /a/ in Nupe. After first positing /a₁/, /a₂/, and /a₃/, he redefined them as underlying /ɛ/, /a/, and /ɔ/. After the application of various phonological rules to these underlying phonemes, they were all neutralized as [a]. His analysis resulted in a heated debate (cf. Harms 1973 and Hyman 1973) over the degree of abstractness allowable in phonology. Although the Nupe situation is synchronic and the Indo-European diachronic, the meta-principles involved are the same. In both instances, the algebraic forms are perfectly adequate as descriptive tools but may fail to capture linguistic reality.

German grammar, but rather that one should look for every possibility of recapturing as many aspects of the proto-language as possible, investigating particularly the question even of how to go about searching for, e.g., diaphasic features of a non-attested language (cf. here the words for 'fire' and 'water' in Proto-Indo-European and the possibility of a split area of application).⁹

As will be seen in Chapter 4, when looking at earlier views on the evolution of vowel systems, scholars in the early 19th century believed that some languages (and their speakers) were either more or less highly evolved. By the later 19th century, it became more and more clear that there is no correlation of primitive material culture or earlier cultural stage to more primitive/less highly "evolved" language (Lyons 1991:74-75). The non-evolutionary understanding of language may have originated in geology and is termed *uniformitarianism*. This proposition states that the historical developments leading to the present must be explained in terms of the characteristics and properties of the present. In geology the implications of this view were revolutionary. A world that was created some 6000 years before, as was believed under a literalist Creationist model, became an impossibility, for the observable processes of geological change are much slower.¹⁰ The concept of uniformitarianism in linguistics has never been convincingly challenged (Lass 1986; Lyons 1991:77; Nichols 1992:277-8); however, it is frequently misunderstood or questioned (Joe Salmons, p.c.).

When dealing with physical law, the uniformitarian approach seems safe and reasonable. However, in dealing with social and psychological structures, the validity of uniformitarianism becomes less secure. For the evolution of languages, a date *ante quem* may be assumed (e.g., using physical paleontology) at which there was no form of language as we define it. At some point, probably beyond any recovery by empirical research, man began to communicate with linguistic signs. We may state with certainty that the first forms of spoken communication were not as developed as those historically attested. Bickerton (1990) sets up two stages of language evolution. One, "proto-language"¹¹, has affinities to pidgins and languages which are improperly learned by foreigners or children in linguistically deficient environments (e.g., Genie, who spent the first decade of her life with almost no language input; cf. Curtiss *et al.* 1974). The second stage comes about almost without transition from the "proto-language" and is in all essentials like languages now attested (cf. discussion by Mufwene 1991). If Bickerton is correct, then uniformitarianism is reasonable in reconstructing

⁹For example, Latin *ignis* vs. Hittite *pahhur* where the former is animate, the latter neuter. This division has been suggested to be due to the conceptualization of the world in terms of the divine force present in entities as well as in terms of the entities themselves or as a reflection of an earlier stative alignment of Indo-European (cf. Stepanov 1992:174ff.).

¹⁰Josiah Dwight Whitney, the brother of William Dwight Whitney, was one of the most noted 19th century American geologists and may well have been at least partly responsible for the philologist's introduction of the concept of uniformitarianism into linguistic thinking. Christy (1983) gives a lucid account of the history of uniformitarianism in linguistics.

¹¹Not to be confused with the standard use of the term by comparatists.

Indo-European, for the cultures attested for the Indo-European sphere of influence (despite its disputed pinpointing) are of a high degree of development which seems to require a functioning language. If, however, Bickerton is wrong and languages are still evolving, then reconstruction of realistic proto-languages becomes an impossibility unless the principles of this evolution can be discovered.

Uniformitarianism in linguistics has important implications for the study of Indo-European. First, if languages do not evolve (i.e. they merely change), then there is no justification for taking the oldest attested languages as the absolute model for comparisons unless cogent arguments for this apart from age can be developed.¹² Second, if languages in the last several thousand years have stayed within specific operational parameters and have changed according to a specific set of patterns, as can be found in historically attested languages, then one may logically expect to be able to go backwards from related languages by means of logical patterns of change and reconstruct the proto-form of the language.¹³ More importantly, the branch of linguistics which is concerned with defining the sets of patterns and structures which occur *and* do not occur in languages, i.e. typological linguistics, will play a major role in any discussion of a reconstructed proto-language.

6.0 Conclusion

I have claimed that a proto-language as formula represents a picture of a real language and that depending on the linguistic subsystem in question, this picture may be quite accurate. The greater the expected accuracy, the more one can apply what is known about real languages to correct and guide

¹²Of course, age is commonly associated with archaicity. However, in the early years of reconstruction of Proto-Indo-European, part of the emphasis ascribed to Indo-Aryan was in keeping with a glottogonic point of view: the oldest languages attested were felt to be of the most archaic nature and to fit into a universal developmental pattern. Thus, Sanskrit, e.g., being the oldest attested Indo-European language preserved best the features of the original language whereas Greek or Latin, being later, were further developed systematically. The evolution of languages consisted of three stages: development, apex, decline. Sanskrit, with its complex nominal and verbal inflections represented accordingly a stage only slightly past the apex of development and only slightly into its decline. As the speakers of languages became more and more "cultured" the *Spracheist* which guided the use and form of language became less and less important, making way instead for a mechanically more complex and efficient language, at the cost, however, of inherent perfection and structural complexity (Benware 1974).

¹³This second implication includes the possibility that there is some form of evolutionary movement in language. Whereas Bickerton's arguments support a fully functioning language system at the time of Indo-European (and for a long period before then), universal developmental trends could conceivably be affecting all languages in a given direction. However, in keeping with uniformitarianism, this direction should be observable in the present and its effects should be calculable. Uniformitarianism does not mean stasis.

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reconstruction. In the next two chapters I will discuss in greater detail the question of scales of reconstructibility and their relation to work in typology.

Chapter 2 Principles of Typology

Ἄλλως τε, εἰ καθολικόν ἔστι τὸ παράπηγμα, οὗτοι πάντα τὰ κατὰ μέρος δύναματα ἐπελθόντες καὶ τὴν ἐν αὐτοῖς ἀναλογίαν κατανοήσαντες συνέθεσαν αὐτό, ή οὐ πάντα. ἀλλὰ πάντα μὲν οὐκ ἐπελθόντας γάρ ἔστι, τῶν δὲ ἀπείρων οὐκ ἔστι τις γνῶσις. εἰ δὲ τινά, πόθεν δτὶ πᾶν δύναμα τοιοῦτον ἔστιν; οὐ γάρ δ τι τιοὶ συμβέβηκες δύναμαι, τούτο καὶ πᾶσιν. ἀλλ᾽ εἰσὶ τινες οἱ πρὸς τοῦτο γελοίως ἀπαντῶντες καὶ λέγοντες δτὶ ἐκ πλειόνων ἔστι τὸ καθολικὸν παράπηγμα. οὐχ ἔνδρων γάρ δτὶ πρῶτον μὲν ἄλλο τί ἔστι τὸ καθολικὸν καὶ ἄλλο τὸ ὡς ἐπὶ τὸ πολὺ, καὶ τὸ μὲν καθολικὸν οὐδέποτε ἡμῖς διαφεύδεται, τὸ δ' ὡς τὸ πολὺ κατὰ τὸ σπάνιον εἴθ' δτὶ καὶ εἰ ἐκ πολλῶν ἔστι τὸ καθολικόν, οὐ πάντα τὸ τοῖς πολλοῖς δύναμαι συμβέβηκός, τούτο ἐξ ἀνάγκης καὶ πᾶσι τοῖς δροειδέσι συμβέβηκεν, ἀλλ' ὅν τρόπον ἐν πολλοῖς καὶ ἄλλοις φέρει τινὰ κατὰ μονοείδειαν ἡ φύσις...

Furthermore, if the rule is universal, they have constructed it either after surveying all the particular words and noting the analogy they present, or else not all of them. But they have not surveyed all of them, for they are infinite in number, and there is no knowledge of infinites. And if they have surveyed some, how do they know that every word is of a like kind? For that which is a property of some words is not a property of all. But to this there are some who make an absurd reply, saying that the universal rule is based on the majority of cases. For they have failed to see that, firstly, what is "universal" is one thing and what holds good "for the most part" is another, and that which is universally true we never find false, but what is true "for the most part" is false occasionally; nor, secondly, have they seen that even if the universal is composed of many, it is not always the case that the property of the many words is necessarily the property of all words similarly formed, but just as in many other things nature produces some with a unique form...

Sextus Empiricus, *Against the Professors*, I.224-226
(transl. Bury 1949:127-129)

1.0 Introduction

The term "typology" has been used in contradictory ways and contexts by historical linguists. In this chapter, I will show that what is given a cover label "typology" in fact may be seen as two separate but linked procedures:

- 1.) Empirical study of occurrence and non-occurrence of features, inventories, or rules.
- 2.) Correlation of this statistical study to "language types" and discovery of implicational structures.

Each of these procedures has significance for reconstructing a proto-language, although in different ways.

2.0 The Typological Approach

A number of monographs on linguistic typology have appeared in the last years (e.g., Altmann & Lehfeldt 1973; Greenberg 1974; Ramat 1987; Comrie 1989; Croft 1990; Ineichen 1991). Croft (1990) gives what is perhaps the best overall picture of the method and material. Typology is not a specifically linguistic approach. It is a methodological procedure of classificatory nature. The premise of the method is that items which are considered of the same category may be classified into a limited set of subgroups. Taking linguistic typology, this means that a general category is established to comprise all human languages as opposed to, e.g., apiary choreography. The subgroups are arrived at by classifying the languages according to their possessing or not possessing some specific characteristic(s). There are typologies of meta-analysis (Dunkel 1987) or of linguistic change (Markey 1986), all vital concerns, yet the commonality of approaches reflects a similar method.

"Universals" are the classificatory criteria by which typologies are constructed; they are sets of structural patterns. Typology is the attempt to define and inventorize these patterns. Put differently, the axiom that languages are systems implies the existence of systematic structure types. The choice of analytic criteria used in defining language types is in and of itself arbitrary; and it is inaccurate to speak of "doing typology" as if there were only one set of patterns to be looked at.

Research in linguistic typology needs to examine the following matters (cf. Ineichen 1991:28-30):

- 1.) What are the important types and how are they defined?
- 2.) What is the relationship between various types and the stages inbetween?
- 3.) What effect does disturbance of organizational elements play in reorganization, repatterning, i.e. how strong are the types as factors of language change?
- 4.) Explanation of types (cf. Hawkins 1988).
- 5.) Cataloguing of types.

2.1 Range of Universality

Theoretically, any feature of a language may be taken as the basis of a typology. For example, some of the very earliest typologies classified languages as to their word for 'God'. In the 17th century Scaliger (cf. Sternemann & Gutschmidt 1989:125) divided up the European languages into a *Bog*-group, a *God*-group, and a *θεός*-group. Whatever the implications for religious history, this classification was of little systematic value and the linguistic implication of membership in a particular type was not investigated. Hammond, Moravcsik & Wirth (1988:14) rank the distribution of universals in terms of their explanatory value and constraining force (i.e. number of language types which they exclude), from "existential statement" as least valuable to "unrestricted universals" as most valuable. They also distinguish between universals and statistical generalizations (pp. 12-13). However, the question is left unanswered as to how statistically

significant a generalization may be before it can be more or less equated with "absolute universals". It is generally felt that a typology is of value if it covers as large an amount of a language's structures as possible. As will be shown in the following discussion, one may rank linguistic patterns on a scale of universality (cf. Campbell 1980:17; Harris 1985:263):

idiosyncrasy -	statistical universal - implicational universal ^a	unrestricted universal implicational universal ^b
----------------	---	--

For example:

idiosyncrasy: German uses a low vowel in one of its words for 'buttocks'.

statistical universal: More languages have five vowel inventories than any other type.

implicational universal^a: If a language has voiced aspirate consonants, it has voiceless ones as well.

unrestricted (absolute) universal: All languages have vowels.

implicational universal^b: Those languages which have nasal vowels also have oral vowels.

Language idiosyncrasies represent those arbitrary characteristics which are language specific and must be learned as lists. One thinks of the relationship between semantics and phonology (despite the claims of psycholinguists that there are connections) as explicated by de Saussure. A 'tree' is called a *tree* in English for no other reason than that one learns this form from other speakers. It could just as easily be called *bush* or *train*.

An example of an unrestricted universal is that all languages have both autosegments and segments.¹ Katičić (1970:25) terms this type of universal: "very important linguistic universals." They include but are not restricted to those properties which make up the definition of language in general: use of signals of one or another kind, communicative goals, specific to humans (as yet), etc. If language is defined, e.g., as confined to acoustic signals, then sign languages or writing are automatically eliminated from the definition. A definitional universal may, of course, also apply to some feature of a language. For example, a vowel is defined as [+syllabic]. Anything which is [-syllabic] is therefore by definition not a vowel. An important distinction is between definitional universals and those universals which are exceptionless in the world's languages but for which an exception could still be considered a language. For example, despite attempts to prove the contrary, no language has been discovered which uses either exclusively vowels or consonants; yet, such a creature would still fit into the definition of language. Finally, there are unrestricted implicational universals,

¹ Autosegments include such features as intonation and accent; segments make up the "skeleton" of phonology and include such things as consonants and vowels.

i.e. ones which may not occur in all languages but which are without exception in their pattern of implicature.²

The most studied universals, implicational, are those which are not found in all languages; rather they recur in groups of languages and are characterized by commonalities of multiple elements' patterns. They may be statistically or unrestrictedly universal. Implicational universals suggest that if structure X is found in a language, then structure Y will also occur. Numerous logical variations of the approach are possible. If structure X, then not structure Y; if structure X, then Y, but only if also Z. Ramat (1986:5-6) distinguishes between "solidarity" A \supset B and "correlation" A+B. Greenberg has been the pioneer in researching implicational universals; cf. for example his division of the languages of the world by the word order of V(erb), S(ubject), and O(bject) and the relation of various other grammatical structures such as the position of adjectives to the membership in one or the other class of language (1966). Lehmann, takes the idea a step further, suggesting that Object and Verb are the most relevant elements for a typology (1974a; but cf. Bauer 1992: Chapt. 2 who notes that there are indeed differences between SVO and VSO. VSO languages are "more consistent").

Study of creoles and pidgins offer perhaps the closest thing to laboratory experiments on how languages may arise and what they must have to function (Holm 1988:61-65). However, the general similarities among creoles and pidgins in different parts of the world are still not fully understood: monogenesis or universalism? Romaine (1988:267-268) warns of misinterpretation about universals because of coincidental survival of features.

Jakobson (1935) noted that for a number of phonological implicational universals there is a correlation between the ordering of implicature and the ordering of children's learning patterns or loss patterns in people with aphasia. For example, languages with affricates always have fricatives. Children learn fricatives before they learn affricates. Aphasics will lose affricates before they lose fricatives.

Study of markedness theory and of implicatures is closely related (Croft 1990:64-94). The concept of markedness goes back to the Prague School of the 1920's and 1930's (cf. Battistella 1990:5ff.). Its basic foundation is the idea that language consists of oppositions of which one is always more marked than the other. This "markedness" will be expressed by greater rarity, additional features, greater instability, etc. (cf. Croft 1990:70-91 for a more extensive listing of criteria of markedness.). When two features are involved in an implicature, the implicans is more marked.

²Another possible kind of universal could be called a "weak absolute universal." By this I mean some tendency which is absolutely universal to all languages but which is only sometimes expressed. To give an example, Bauer (1992) claims that there is a universal for all languages to tend towards (but not necessarily reach) SVO status. Nichols (1992) notes that SVO languages are statistically the most common, and this reflects the universal trend.

Inventories of types can be formulated, for example, in the case of vowels in the following manner:

If a language has 3 vowels, it will have a.

Note, however, that the implicans is on the level of analysis, not motivated by the language itself. One might divide all such implicatures:

- 1.) If dual, then plural
- 2.) If three vowels, then *i u a*

Implicature 1 divides languages into two types, with and without a dual, i.e.:

language [+ dual]	language [- dual]
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It is also based on a cognitive relationship between these modes of denoting multiplicity. Implicature 2 divides languages non-binarily, but suggests that each will fit into specific types in terms of inventories possible. There may be a later subdivision within inventory categories, e.g.:

- 3.) If 5 vowels, then either X or Y.

This third sort of implicature is like those of color terminology as described by Berlin & Kay (1969)

Greenberg (1978:2:2) states that inventories of types have been relatively well catalogued but that the areas of language change, synchronic rule systems, and the relationship of phonology to syntax/semantics need further examination. Ramat also feels that linguists cannot be satisfied with mere lists of cooccurring features but must set up hierarchies and discover underlying structures (1983:183). However, a catalogue is vital because of the empirical/deductive nature of setting up typologies (Ramat 1983:184). Before underlying structures can be discovered, the surface regularities which reflect them must be determined and explained. Patterns may be explainable as reflecting inherent cognitive universals (cf. Bauer 1992), patterns of physiological constraint (e.g., "ease" of articulation), patterns of external reality (e.g., number of terms for 'parents'), diachronic developments of motivated patterns (e.g., root structure constraints in Germanic), etc. They may also be inexplicable.

Typological studies in the 19th and earlier 20th century were morphologically based. Humboldt, Finck, Steinthal, and Sapir developed a method which ultimately classified languages according to their morphology as: inflectional, agglutinative, fusional, or isolating (cf. Schrijnen 1921; Comrie 1989; Anderson 1992, Chapt. 12). This kind of typology has generally been rejected because the patterns described are usually only valid to describe specific

morphological processes not language types. Furthermore, the incommensurability of these terms as actually used in different languages' descriptions is a sizeable obstacle to their practical application. However, these typologies attempted to encapture widescala interrelationships within languages which were in some way or other "most fundamental" to them.

One of the hottest questions in the debate of using typology in reconstruction focusses on the difference between that which is absolutely universal and that which is statistically universal. The problem of unrestricted vs. statistical universals (implicational or not) in reconstruction is that characterized by the debate over the status of token and type (cf. Armstrong 1989). As noted in the quotation of Sextus Empiricus at the head of this chapter, in terms of "absolute truth" there is a great difference between that which is universal and that which is good for the most part. However, when analyzing empirical data, a statistical approach is justified. The question is whether a statistically valid generalization from a mass of data may be applied to an isolated instance. As I will argue below in Chapter 3, this will depend on the strength of the degree of statistical universality and of the interpretation of formal evidence.

3.0 Synchronic Application

The typological approach as such is not specifically confined to any one area of linguistic research. It does, however, show a correlation in reliability to the number and variety of elements of the investigated material, whether phonology, morphology, syntax, or semantics.

Phonological typology is concerned with inventory and rule systems of phonemes. As described in Chapter 4, this is one of the most well established areas of typology and one holding the most promise of applicability to reconstruction.³

Morphological typology is a problem, for many would consider it a subset of syntactic typology. In Chapter 5, I discuss in greater detail the problem of defining the two areas. Typology of morphological structures has focussed on word-formation and derivation patterns, case alignment (esp. accusativity vs. ergativity vs. stativity), mood, tense, and aspect.

Since the 1950's, more and more effort has been devoted to the synchronic explanation or description of word order, indeed, word order became the main empirical phenomenon into which syntacticians delved. It is thus remarkable, that when Horne wrote his 1966 survey of problems of language typology he could state that syntactic typology was the least investigated and most unrewarding area of all. Now, a quarter century later, some would go so far as to

³The typology of writing systems reflects phonological typology. Justeson (1976) and others have noted that the needs of writing systems to differentiate enough between sounds have resulted in orders of priority for specific features to be represented. Hence, some features will always be represented in a syllabary, others are optional, others even more so. The same applies to alphabetic writing systems. Some universals of writing systems may reflect universals of the languages represented.

say that syntactic typology is the single most important branch of typology of all. This change of status is a result of the recognition of several far-reaching sets of implicational structures. One such basic parameter is claimed to be the position of the object and the verb in simple, unmarked sentences (Greenberg 1966; Lehmann 1974a, etc.). From this, implicational structures of types of relative clauses, positioning of adjectives, use of cases, post- vs. prepositions have been set up and catalogued. Another basic parameter is the marking of heads vs. dependents which Nichols claims has the highest correlation to other language patterns (1992). Nichols book is important because she not only bases her conclusions and definitions of universals on a wide base of carefully selected languages but also because she shows correlations between the relative markedness and stability of her features in genetic and areal terms (cf. below, §4.0). Her patterns of correspondence are (1992:113-115; cf. my Chapter 6 for more details on some of these types):

Head marking

- 1.) Head marking and low complexity
- 2.) Stative/active & hierarchical and head marking
- 3.) Verb initial and lack of order take head marking

Dependent marking:

- 4.) Dependent marking and high complexity
- 5.) Ergative alignment and dependent marking
- 6.) Verb middle or final favor dependent marking

Other:

- 7.) Ergative alignment and high complexity (possible universal)
- 8.) Statistically most common set of features is SOV, accusative alignment and moderate complexity

Having noted syntactic typology's rise in importance, it may seem surprising that the present study does not include a chapter on the reconstruction of syntax. There are a number of reasons for this. On the one hand, more than in any other subsection of Indo-European studies, the reconstruction of syntax has been conducted using typological approaches so that anyone using studies such as Lehmann (1974a) or P.Friedrich (1974) will find good descriptions of their methodology. On the other hand, as will be argued in greater detail in Chapter 3, the reliability of using syntactic "types" to reconstruct specific "tokens" is doubtful (cf. Winter 1984; Hock 1991:319).

3.1 Linguistic Prototypes

A number of points to be covered in the following chapters assume a "prototypical" understanding of semantics and grammatical categories. Taylor (1989) gives the most complete discussion of semantic prototypes in language and distinguishes the prototype approach from a classical, Aristotelian approach to categories which defines all things binarily as members or non-members of classes with no grey territory. Investigation in prototype theory is concerned

with the method of storage and access of semantic information about classes (as opposed to individual items, a wholly different problem).

It was the work of Berlin & Kay (1969) in color terminology which opened up the way for fruitful research into semantic prototypes. They showed that colors are semantically defined by prototypical centers of meaning, and that these centers of meanings are universally accepted and used by speakers of any language group. Although individual speakers or language groups may differ on the precise border between, e.g., red and orange, they will uniformly agree on what is most typically red or orange. Berlin & Kay (1969) showed that languages name up to 11 basic colors in a clearly defined and empirically determinable sequence. If there are only 3 basic color terms they will *always* include certain colors and *always* exclude others. For example, in Bantu there are three primary colors as predicted by Berlin & Kay: 'black (dark)' - 'red' - 'white (light)' and other color terms are clearly derivative, e.g., Swahili *rangi ya majani* 'green' (= 'color of leaves'). The seeming universality of color term patterns may be based on the physiological structure of the eye and not on the cognitive apparatus (Tischler 1989). Nonetheless, and although the approach may be rightly criticized for being too loose in its definition of "primary color term", the typology of languages by inventory of color terms remains convincing. The strongest application of prototype semantics implies that just as colors have prototypical semantic centers, so too do other lexical and grammatical categories. One wonders what other semantic fields might demonstrate such clear implicatures (cf. the discussion in Holenstein 1985).

Inasmuch as a system or systems of semantic prototypes can be determined (for colors, emotions, kinship terms, case marking), the typological approach laid out above can be applied to its features, inventories, rules, and description of implicational structures vs. their degree of universality.

A challenge to the prototype theory *per se* is found in Wierzbicka (1992) where she continues work which has tried to reduce the semantics of natural languages to less than two dozen elements as an "alphabet" of human thought, a universal metalanguage which is very specific (i.e. not vaguely prototypical). These elements include such "semantic primitives" as *good*, *feel*, *think*, *father*, *mother*, etc. Wierzbicka suggests that a non-ethnocentric cross-cultural analysis of grammar and cognition is only possible using this universal semantic metalanguage. In fact, her approach, while fascinating, is a form of componential analysis which makes use of a very limited (limiting?) set of features. Its taxonomies and analyses are intriguing; yet they allow too little flexibility in individuals' command of nuances and their recognition/understanding of the different semantic connotations and emotive forces implied in words used by speakers of other languages or even within the same language community. Wierzbicka's work shows, however, that the set of word fields which have universal implicational semantic patterning may be quite limited.

4.0 Diachronic Application

Typology as a method in the study of diachrony applies both to describing the transition from one synchronic set of features to another, and to describing patterns of change *per se*. Further, assumptions about the strength of typological consistency may provide material for a teleology of language change and offer (weak) predictive power about the direction and probability of change. We will discuss some examples of these uses below. Note that these are very different uses of what goes by one label. In describing the transition of one typological state to another, a typological analysis is presupposed. In the strict sense of the word, the investigation of the change from one type to another is not typological. However, such research does help to understand the typologies which have been established. The study of change typology, on the other hand, is an actual typological procedure.

Diachronic typology is used to typify the development of synchronic language states as described in §3.0. Because their developments may throw light on their synchronic nature, it is especially the larger scale, non-absolute, implicational hierarchies which have been studied. For example, the changes from Proto-Indo-European or Vulgar Latin to French can be characterized as a change from type X to type Y with intermediary stages (cf. Joseph 1989). Bauer (1992) has undertaken a larger study of this particular change and has typified it part of the shift from a Proto-Indo-European left-branching SOV language to present day French which is right-branching SVO. She claims a universal tendency that complex SOV patterns are acquired more slowly than SVO patterns. Thus, the shift from Latin (and Indo-European à la Lehmann 1974a) may be in accordance with higher universals.

A major use of the typology in diachronic studies is for explaining, motivating, and even predicting language change. The two principles underlying implicational universals are dominance and harmony (Croft *et al.* 1990:x). Elsewhere, Croft (1990:193) discusses the problem of typology and change in terms of competing motivations of economy and iconicity.⁴ These two principles may come into conflict when the improvement of one damages the other. When language preference rules for competing motivation are determined, they will result in the following types:

- A is used, but B is not, although preferred.
- B is used, but A is not, although preferred.
- A & B are both present; non-preferred situation.
- Neither A nor B is present; non-preferred situation.

All other things being equal, a language will *tend* towards consistency and completeness of its structural patterns, although in practice this may never occur. Lehmann (1974a) discusses such languages where typological forces have

⁴Iconicity is the principle of having one form per meaning or function; economy calls for as few forms as possible.

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caused a maximum amount of change and the languages in question are in a state of typological consistency (e.g., Japanese, Turkish). He characterizes these languages as being extremely stable. Lehmann has been criticized for his use of "consistent" languages because few languages seem consistent (Matthews 1982). Lehmann (1991) has reclarified his position to state that in order to work with data one must use idealizing models or else simply list data. Languages are not ideal, but those in relative isolation seem more consistent than others, and precisely this pattern of consistency in isolation deserves looking at (cf. Werner 1987; my Chapter 5, §3.0).

If typological consistency is a force for language change, then investigation is needed to determine to what extent and in what areas. One might conceivably set up a continuum of strong to weak "compulsive" force for typological language change. The strength of the structural compulsion may be a variable factor and relative both to other factors for change and to the subsystem involved. Vennemann (1988) has shown that when other phonological changes disturb the syllabic patterns in language, the first changes that attempt to remedy the situation are in those places where the "greatest damage" has been done. This agrees with the "*Natürlichkeit*" principles of Wurzel (1985). Joseph (1989:56-7) also investigates the problem of the cart and the horse: does typology cause change (as claimed by Lehmann 1974a or Holman 1980) or merely constrain the paths of change (Hawkins 1985, 1988)? He adduces evidence from Romance for the latter (cf. Bauer 1992). Haider (1985:3-5) states it differently, saying that typological change will come about when the statistical relationships between the subsystems are too complex for language users (one thinks here of the Old Irish verbal system which violates principles of iconicity and economy). He further supports the idea that a typologically marked system, i.e. one in violation of typological universals, will change. A case in point might be found in Indo-Aryan where in Middle Aryan an ablative plural form in *-to* was created to replace lost distinctions but was not maintainable (Bloch 1965:140).

Campbell (1980) argues that exceptions to universals come about through external causes, not from language internal mechanisms, echoing the idea that languages left on their own will tend towards consistency. Only if we can factor out other causes of language change such as literacy, contact with other peoples, trade contacts, or technological progress can we determine the actual strength of typological consistency for language change or conservatism. The amount of interfering "noise" is high so that proof of a teleology of language change based on typological consistency will presumably always be rather weak (cf. Hock 1991:378 and his Chapt. 13 in general; Dausen 1990 on the distinction of isolate vs. contact languages). One ought to look at languages such as Latin, Sanskrit, Avestan, or Old Norse and their descendants in terms of typologically consistent or inconsistent developments in contact and isolate situations. For example, Icelandic was for centuries relatively isolated from contact with other languages and had little phonological change affecting morphology. Hence, several factors in language change could be eliminated (Wurzel 1989).

It has long been recognized, if not always in these terms, that the atomistic description of individual changes in languages should be used and synthesized in constructing a general typology of change (cf. Bonfante 1945, 1946; Markey 1986; Yartseva 1990). In fact, part of the process of "becoming" a competent Indo-Europeanist has always been recognized as coming to grasp "intuitively" the concepts and types of changes in language so as to be able to pick and chose between alternative explanations for the history and development of specific features of the reconstructed proto-language and its offspring. However, much of this intuitive "knowledge" is never well codified or catalogued. It is expressed less openly in such phrasings as: "this development is quite common in the world's languages" or "this path of change must be rejected as quite improbable". Listings have been attempted of the types of changes which may occur (e.g., Lüdtke 1989:134), but they are not useful because they are only labels with little reference to substance. One may contrast these efforts to, e.g., Ferguson's article (1990) on the developments of *s* to *h* as a general process in languages of the world and share his desire that there be compiled a reliable cross-linguistic cataloguing of phonological (and other) change types.

Diachronic universals may be of the type (with degrees of implicational strength and absoluteness as noted in §2.1):

Stage I CéCeCéCe will generally develop to Stage II CéCəCéCə or CeCCeC

or

s will develop to *h* (whereas the converse is not probable)

or

If a language loses category X, it will also lose category Y

If one language has a synchronic implicational pattern which may be the result of a process (cf. Heine *et al.* 1991:148) and another related language only has the second part of the implicanture, then a development in the second language may be assumed. For example, Hittite *hant-* 'forehead' and *hantezzi* 'foremost' correspond formally to Greek *ἀντί*. There is a diachronic universal:

body part → spatial/temporal.

This suggests a development in Greek where the term for body part (Indo-European: **H₂enti* 'forehead') developed spatial meaning (cf. Chapter 5, §3.0).

Guy describes the social contexts in which various kinds of change occur, claiming that in fact all typologies of change are more on a sociolinguistic than formal level (1990:50). This has some important implications for research into proto-languages and their changes. We can imagine what varieties of contact

situations the Indo-Europeans may have experienced. Just as Anthony (1991) has shown the relevance of typology for the analysis of cultural change (specifically, the impact of adoption of the horse on marginal agricultural societies), the social scenarios associated with reconstructed history may be analysed in terms of language contact situations. If, for example, a certain type of change is most common when a language is in contact with a substratum (as opposed to when there is contact in trading or the language in question is the substratum), then evidence for this sort of change helps to reconstruct the proto-situation and conversely, knowledge of prehistoric situations will help to sort out linguistic data. Salmons (1992a), for example, demonstrates that in adstratal contact, tonal systems tend to give way to pitch and stress accent systems as areal features. The risk of circular reasoning is large, but it can be avoided, if the typological parameters are clearly and unequivocally determined using data independent of a proto-language.

Typology of semantic change has also been opening up as a constrained approach in *inter alia* the work of Sweetser (1990). She notes that because of the human perceptual system "...we have universal, perceptually determined possible options for spatializing time..." (1990:9). This has the result that a cognitive semantic approach can explain certain independently reoccurring changes in different language. One universal diachronic change is that "...spatial vocabulary universally acquires temporal meanings rather than the reverse." Some "natural" paths of semantic change can be discovered, but not enough to predict change wholesale. One of the limited areas which show regular patterns semantic change is that words associated with 'sight' are linked with intellection and obedience but 'touch' with emotion and not the other way around (1990:46). However, Sweetser admits that the parameters in semantics are "far more complex" than in phonology, not being constrained by physiology (1990:48).

Nichols (1992) has included in her head/dependent (= H/D) marking typology of the worlds language a diachronic component, namely the relative areal and genetic stability or instability of specific kinds of features. This lends a new aspect to reconstructive work. Until now, one was confined to areas like phonology which have tight cohesion of a small number of elements. Nichols' material will help allow us to look at common morphological and syntactic features of the Indo-European languages and just which are most or least likely to be inherited. She defines a set of features on a scale of most genetic to most areal, whereby it is seen that morphology is more conservative than syntax (1992:167):

$$\begin{array}{ccc} \text{Most genetic} & \leftrightarrow & \text{Most areal} \\ \text{Alignment} > \text{Complexity} & \gg \text{H/D marking} & \gg \text{Word order}^5 \end{array}$$

⁵>> indicates a larger break. Alignment refers to the classification of a language's nominal morphology.

Low complexity languages (i.e. basically isolating) are easily affected by areal factors, "If, on the other hand, a language family has a good deal of morphological complexity, areal pressure may change the form and function of the morphology but will not easily reduce its level." (1992:168). All in all, in residual and diversity zones, languages tend to increase complexity. She gives the following hierarchies of genetic vs. areal stability (1992:170):

Genetically most stable \Leftrightarrow Genetically least stable
 Alignment >> H/D marking > complexity > Word Order

Most areal \Leftrightarrow Least areal
 Word order > Alignment > HD marking > Complexity

"In general, alignment and complexity are strongly genetic, word order strongly areal, and head/dependent marking moderately genetic and moderately areal. Word order is the only feature that is completely consistent, emerging as either most areal or least genetic of every ranking given here." (1992:171). This is a more promising approach than simply noting that, e.g., several of the older Indo-European languages are OV, ergo, Indo-European was OV. The above patterns suggest that OV vs. VO structure is the least stable feature of many so that the commonality of OV patterns in various daughter languages may not be significant. The relative genetic stability of alignment will be important when discussing the reconstruction of Proto-Indo-European nominal morphology in Chapter 6, §3.1.1 & 3.2.1).

5.0 Conclusion

From the above given description of the typological approach, it can be seen that it is an empirically based method which works less with absolutes than with scales of statistical significance. It has two areas of application:

- 1.) Degree of presence or non-presence of features/systems/rules
- 2.) Discovery of implicationaly related structures

Clearly, Area 1 applies to the material covered in Area 2. Typology has sometimes been used to refer only to "patterns of implicational structures" or has been confused with "realism". In fact, realism in a reconstruction requires consideration of the range of matter which is covered by both areas of application. Chapter 3 will demonstrate some of the possibilities, methods, and limitations of the typological approach here defined when actually applied to reconstructions.

Chapter 3

Typology and Reconstruction

A TAIL behind, a trunk in front,
Complete the usual elephant.
The tail in front, the trunk behind
Is what you very seldom find.

If you for specimens should hunt
With trunks behind and tail in front,
That hunt should occupy you long;
The force of habit is so strong.

A.E. Housman

1.0 Introduction

Three of the possible ways to study languages are to look at:

- 1.) What is universal about all human communication and language.
- 2.) What patterns exist among languages which are exclusive of some but inclusive of many.
- 3.) Idiosyncrasies of one language in terms of that language.

Linguists of Type 1 will look, for example, at only their own languages because they will presumably contain the same elements of grammar that are universal to all languages. Type 2 linguists look at large samples of languages in order to determine what the patterns are; they attempt to capture data in terms of the typological framework which was discussed in Chapter 2, §2.1. Typologists will also examine large-scale patterns in order to see what their underlying principles or motivations are. Type 3 linguists are concerned with a language or a group of languages for their own sake, but will make use of tools and methods developed by Types 1 and 2. If these tools don't apply, then they are disregarded as irrelevant.

How does Indo-European linguistics fit into this pattern? It tends towards Type 3. However, there are two philosophies¹ of doing Indo-European linguistics. One, the Idealist or Abstractionist, is concerned primarily with the older attested languages and members of the linguistic family. Abstractionists want to understand family internal relationships and will reconstruct forms as a "shorthand" of recognized relationships in the language family. Realists, on the other hand, are concerned with the actual prehistoric language (and culture, history, etc.) and its speakers. Abstractionists and Realists make differing uses of linguistic approaches. Abstractionists are concerned with philological regularity

¹The word "philosophy" implies that this is a matter of faith. In fact, as shown in Chapter 1, the two approaches are clearly interrelated and differentiated only in the degree of interpretation that their followers are willing to accept.

and patterning. Their goal is, e.g., to understand which parts of L₁ relate to which parts of L₂ and how. On the other hand, the Realist wants to recreate or approximate reality of a prehistoric language. It is the question of how to use Linguistic Approach 2 (i.e. typology) in order to "do" the Realist type of Indo-European studies which is the concern of this study. While both Realists and Abstractionists may analyze their material in terms of typological linguistics, Realists will use typological material actively in an interpretive attempt to recover the real language they assume once existed.²

As in prototype theory, none of these types is completely rigid. Many Realists are sceptical of much of the typological approach; likewise, many Abstractionists also use typological linguistics.

Typology has been used since the 19th century in reconstruction (Bynon 1983a:45; cf. Gamkrelidze 1989:117ff). Typology has been integrated with reconstructions to judge their accuracy and propose alternatives, to reconstruct features which have left no direct trace by employing a knowledge of implicational universals, and to explain unusual states or developments of the proto-language. The statement of the principle of using typology as a tool in reconstruction stems from Jakobson (1958) and his view that a reconstruction of a proto-language should not be accepted if it violates the typological constraints placed on known languages. His specific reference was to the extremely odd phonological system traditionally reconstructed for Proto-Indo-European. Following up on his lead, Gamkrelidze & Ivanov (1973) as well as Hopper (1973) suggested a different reconstruction which would fulfill a demand for typological plausibility (cf. Salmons 1993). Laryngealists have reconstructed Proto-Indo-European with one or no vowels (e.g., Kuipers 1968), leading Szemerényi (1967) and others to invoke typological plausibility.

In Chapter 1, I sketched out the procedure of reconstructing a proto-language (preproto-language, etc.) and noted that comparative reconstruction produces a pure formula of correspondences. Internal reconstruction complements comparative reconstruction when working from daughter languages and may supplant it when taking a reconstructed proto-language as a starting point. The means used in achieving the proto-language as a formula create a picture or image of what a formerly existing real language may have looked like. If, as was argued in Chapter 1, the assumption is accepted that the formula as such can approximate reality in some domains, then one expects those

²Lehmann (1990) has pointed out that typologists and students of specific languages may come into conflict for the same reason that some linguists ignore a language after it has borne some desired theoretical fruit. Historical linguists or Indo-Europeanists must be eclectic in using or not using theory because they are not only concerned with the "grand underlying" principles of language but also with the specific literary, social, archaeological, religious, and historical connections of a group of language speakers. In a sense, linguistic theory might be considered a (vital) *Hilfswissenschaft* and not an aim for some Indo-Europeanists (cf. Watkins 1989:798).

areas to agree with what is known about attested languages (i.e. principle of uniformitarianism). The interpretation of the formula will thus make use of attested linguistic structures and restrictions which apply to these structures. This "processing" of a reconstruction/formula represents an interpretative step away from an abstractionist ideal. Typology, as outlined in Chapter 2, is the study of patterns of attested linguistic structures and the strictures on linguistic form. Hence, any reconstruction which is attempted beyond the narrow limits of the comparative method *must* take some kinds of typological evidence into consideration. In the present chapter, the kinds of typological evidence which can be safely used are discussed as well as their areas of strongest and weakest application.

2.0 Range of Typology, Areas of Reconstruction, & Evidence Types

For a Realist reconstruction, we suggest that continua may be differentiated for the range of universality (cf. Chapter 2, §2.1) correlated to types of reconstruction and the relative strength of different kinds of evidence:

Continuum One:

Range of Universality vs. Type of Reconstruction

Absolute universal	Statistical universal	Idiosyncrasy
Reconstruction 1	Reconstruction 2	Reconstruction 3

Reconstruction 1: Realism is criterial.

Reconstruction 2: Typological probability is criterial.

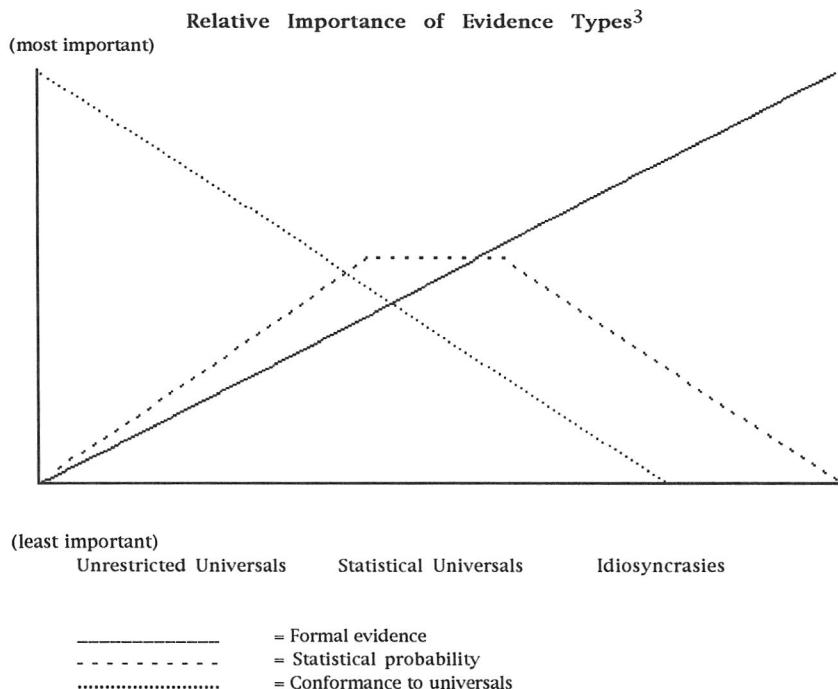
Reconstruction 3: Formal evidence is criterial.

Continuum Two:

Strength of Evidence Types

realism	probability	formal evidence
---------	-------------	-----------------

The evidence types given in **Continuum Two** are each important, but the *relative* importance of each factor increases or decreases in the reconstruction in direct relation to the place on **Continuum One** of the feature or set of features which are being reconstructed.



Formal evidence is always important, but when looking at idiosyncratic features, it is relatively more important than when looking at universal features; the stronger the degree of universality, the weaker formal evidence becomes as a criterion for a reconstruction. Statistical probability of sets of features is definitionally irrelevant when referring to unrestricted universals; however, in the mid-range between idiosyncrasy and unrestrictedness, statistical probability achieves its highest relative importance with regard to other evidence types. The stronger a generalization or the greater its statistical predominance, the stronger it becomes as evidence for the reconstruction. Finally, a conformance to strong or absolute universals is all important for reconstructing any segment of language which normally has a high or absolute degree of conformance to such universals. The weaker the degree of universality, the weaker the conformance to universals becomes for the reconstruction.

³The vertical axis represents ascending degree of importance as a factor in reconstruction. This is *not* meant to be understood as a quantitative statement, but rather as a visualization of some basic concepts.

As was noted in Chapter 2, unrestricted universals come in two kinds. One kind of unrestricted universal is that set of characteristics which a language or some feature of it has by definition, i.e. anything which does not have these characteristics is not a language or a possible feature of a language. The other kind of unrestricted universals are those which are 100% true for all reported languages but for which an exception would still be a language. In terms of reconstruction, the definitional universals are unrestrictedly important for a reconstruction, even if they cannot be given formal expression. Unrestricted, non-definitional universals are also of extremely high importance, but a seeming exception to them is in principle conceivable although extremely unlikely.

For a Realist the formal evidence is irrelevant when speaking of absolute features; and when the formal evidence seems to violate absolute universals (non-definitional), then either the data are flawed or the generalization about absolute universality is incorrect. This conception does not imply that formal evidence can be disregarded or eliminated, but rather that a low ratio of agreement at the left side of the scale in the figure may come about when the data are insufficient. For reconstruction, factors enter in which the synchronic typologist doesn't encounter. First, because the reconstructed language is not attested as such (or in a sense, it is very poorly attested), all features cannot be recovered. Thus, it is precisely the absolute, unrestricted universals and the absolute, implicational universals which *must* be considered if possible. Further, because a reconstruction is an educated guess at what a proto-language looked like, *probabilities* of its being of a particular type or showing the instantiation of an implicational universal is of great importance, not as proof, but rather for the determination and evaluation of possibilities.

Looking at a concrete example, the reconstruction of a Proto-Indo-European *e as the only vowel is problematic because it conflicts with realism and because of formal evidence for, e.g. *a. In terms of the above graphic representation, the existence of more than one vowel is an absolute, exceptionless universal and the relative importance of evidence types is as at the extreme left of the figure. There, the conformance to absolute features is of paramount importance; second in importance is formal evidence; statistical probability is irrelevant. This would suggest in this instance that a reconstruction of one vowel Indo-European on the basis of formal evidence should be supplemented with evidence from knowledge of absolute universals (cf. the more extended discussion of this problem in Chapter 4).

3.0 On the Application of Typology

Above, I discussed the theoretical considerations of using typology in reconstruction. In the following I will look at specific areas and means by which typology is used.

Reconstruction by the comparative method is done by finding regular sets of phonological correspondences in semantically relatable material (i.e. cross-linguistic agreement in the double articulation; cf. Matthews 1991). After

establishment of a proto-language made up of atomistic formulae, their patterns of agreement, systematic inventories, gaps, and rule systems may be laid out. This step is followed by a classification and comparison of this "synchronic" proto-language and its features with other languages. At this stage, "symptoms" may turn up in the proto-language which will invite the use of typology as discussed in §2.0. These symptoms are:

- 1.) Violation of absolute universals
 - a. definitional
 - b. non-definitional
- 2.) Violation of statistical universals
- 3.) Violation of implicational universals
- 4.) "Unusual" patterns

After any revision of a reconstruction using typological evidence, the new structures proposed should be checked over synchronically and diachronically to see whether they create worse problems than they solve.

3.1 Violation of Absolute Universals

If a proto-language violates absolute universals, there are three strict choices available to the reconstructor. Either the realism of the reconstruction has to be rejected because there are insufficient data for a proper reconstruction, or the reconstruction must be reformulated, or the absoluteness of the universal must be called into question. Whenever a reconstruction of distant language relationships must rely on data which have been rendered imperfect by the forces of borrowing, analogy, and change over a great length of time, the probability that a reconstruction must remain formulaic is strong. If a universal violated is definitional, then the reconstruction must be revised, even if there is no formal basis for this revision. To give another example, Szemerényi (1990:135) discusses the phonetic aspects of laryngeals and shows how relative sonority (as evidenced by phonotactics in the environment TRHT, i.e. → TRHT → TꝑT and not TRHT → TRVT)⁴ defines them as spirants. A spirant has as a universal property the fact that it cannot be [+ syllabic] (according to Szemerényi). By this analysis, a reconstruction that assigns to laryngeals syllacticity would conflict with an unrestricted definitional universal and must be rejected or revised. If the universal in question is non-definitional but unrestricted, then the reconstruction should also be modified unless the universal can be weakened. If, for example, one takes the indices of structural complexity which Altmann & Lehfeldt (1973) or Nichols (1992) set up as defining absolute borders of possible complexity in language, then a proto-language which is too complex should be rejected/revised.

⁴Cf. note on transcription after preface. Cf. also Polomé (1965:28-29) on the problem of vocalization of R before laryngeal.

3.2 Violation of Statistical Universals

The less is known about a proto-language, the stronger statistical universals are as evidence. If, for example, one were to write down on slips of paper the names of 100 languages which were pre-selected to be representative for the occurrence of some universal and were then to pick out a slip at random, the chances of the language having the pattern or not are clearly calculable. The less common pattern is not impossible, just less probable. The less common a pattern is, the stronger formal evidence must be for its reconstruction. If the formal data for the presence or non-presence of a feature in the proto-language are ambivalent,⁵ then one should assume its presence if the feature is a near universal or note its possibility/probability. If there does exist strong formal evidence for the violation of a statistical universal, the reconstruction should be revised or subjected to internal reconstruction (cf. §3.4). Revision of a reconstruction based solely on typological evidence is more valid if there are multiple patterns of discrepancies between the originally reconstructed system and attested systems; a revision based only on, e.g., inventory, or some phonological rule's unusualness will be weaker. Reconstruction based on revisions due to violations of statistical universals are models with a claim, not to correctness, but to relative probability of correctness.

Especially in the reconstruction of Indo-European syntax, use has been made of statistical universals which are not very strong and this has caused the approach to be heavily criticized (cf. Lehmann 1974a; P.Friedrich 1974; Lightfoot 1979; Winter 1984). Lehmann (1991) has noted that he is concerned with probabilities, not absolute truth (which is unattainable). If the language reality supposition is not accepted, then one may reconstruct a proto-language as a pure SOV or SVO language; indeed, the assumption of SVO or SOV in the proto-language would seem to call for a reconstruction of a pure language type particularly if the proto-language is not considered real. The main evidence for word order is to be found in what are interpreted to be archaic residues in grammar/syntax such as formulaic expressions in poetic texts (going back to Adalbert Kuhn in the 19th century and discussed in a large number of publications in recent years, cf. Tichy 1990:7), for example, μέγα κλέος 'great fame' and Vedic *máhi śrāvas*. This is opposed to κλέος ἀφθτον 'undying fame' and Vedic equivalent.⁶ However, such collocations are weaker than they appear, for in cultures ascribing value to fame and using related languages, the use of etymologically related words in similar expressions may easily be coincidental (cf. Schwink forth.b).

⁵The question of how to define 'equal reconstructibility' is in itself worthy of further thought.

⁶Brigitte Bauer has pointed out to me that the word order universal of adjective and noun is not considered very strong. More important are, e.g., the type of adpositions and the structure of relative clauses.

3.3 Violation of Implicational Universals

Violations of implicational universals should be judged and dealt with as noted above under §§3.1-3.2. However, here there arises a new dimension to the reconstructive process. We may recall that implicational universals are of the structure

If A then B

with all sorts of possible permutations (cf. Chapter 2, §2.1). The cover symbols "A" and "B" may represent anything from a phoneme to a grammatical rule. For reconstruction this means that if an *A can be formally reconstructed, then a *B must also be reconstructed (subject to the strength of the implicature as a universal) whether there is direct formal evidence for it or not. Conversely, the lack of *B may serve as evidence that the reconstruction of *A was incorrect!

3.4 Unusual Patterns

If a proto-language (or attested language) shows some unusual pattern which is not synchronically associative to some typologically/universally relevant set of features, this can be understood as a development from an earlier stage of the language where the pattern was motivated. The unusual patterns may be stable or unstable. For example, Modern German has relatively few words beginning with /pf-/. This state of affairs seems stable (although in numerous dialects /pf-/ → /f-/). In fact, the /pf-/ words are generally Latinate and borrowed with initial /p-/ whereas Germanic words beginning with /p-/ would have come from an Indo-European **b* which may not have existed. The lack of **b* itself has strong implications for the reconstruction of the Indo-European consonant inventory (cf. Chapter 4). In a related instance, Germanic seems to be almost completely lacking in roots which contain non-homorganic voiceless stops. The few exceptions are stable and there seems no real motivation in the system for the cooccurrence of such consonants to be illegal. Again, this pattern's very lack of motivation is evidence that it may have come from some earlier state where the cooccurrence restriction was motivated (cf. King 1988; also Schwink forth.a on Armenian vowel epenthesis as a no longer motivated retention of the results of an earlier rule system). If a specific motivated implicature can easily change to an unmotivated one, this unmotivated pattern may become common enough to be falsely taken for a synchronically motivated pattern. In fact, it would be the reflection of a universal of change and its occurrence in a proto-language would be evidence for the preproto-language.

If a proto-language (or attested language) has a demonstrable violation of strong and motivated statistical universals, this can be seen as the result of a change from an earlier stage which has been upset by change in some other part of the system (i.e. internal reconstruction). Thus, for example, the reconstruction of the Proto-Indo-European consonants

*t d dh

but not

*th

is formally possible. However, the system thus reconstructed violates a strong universal on the distribution of voicing and aspiration so that the reconstruction must either be rejected or allowed only as an unusual and unstable development from some preproto-linguistic state.

4.0 Limitations and Problems

A major danger in using typology for reconstruction is the fact that one is dealing by and large with statistics. In plain English: nothing demands that, e.g., Proto-Indo-European be non-unique (cf. Kuipers 1968; Haider 1983, 1985:3-5, 1986; Marchand 1988). There are numerous universals which have exceptions in only a few languages, e.g., object initial languages in South America or languages with voiced aspirates but no voiceless aspirates. Beekes invokes this principle (1969:271) in relation to the problem of one vowel Indo-European and states that a rejection on purely typological grounds may lead to aprioristic rejections of valid data and analysis. However, if the warning is made that one applies typological parameters on the basis of relative probability, then its value as a tool is not lost (cf. also Stevens 1992).

To compile the statistical summaries which typology utilizes is also not without difficulty. In compiling a database of phonology, e.g., one is forced to rely on grammatical descriptions which may use similar terms quite differently (Maddieson 1991:198), written by people who may not have understood the language in question as well as one would like (cf. Marchand 1988).

One misuse of typology has been its invocation as proof of a reconstruction when in fact all that has been done is to find some isolated parallel in one or two other languages (*Parallelenjägerei*). If a set of features (change, rule, etc.) can be found in some language that parallels what is proposed for some proto-language, it may or may not be typologically relevant (it often is). Whether it provably is relevant will depend on the statistical universality of the pattern in question. The simple citation of a parallel without statistical support does no more than prove that the feature in question does not violate any absolute universal.

If a reconstruction is revised on the basis of otherwise typological anomaly, the tenet of "simplicity" is maintained (cf. Yngve at beginning of my Chapter 1), but at a possible cost to accuracy. A reasonable comparison may be made to individual vs. group psychology. Whereas group dynamics are fairly well understood, an individual is considerably less predictable. Generalizations and predictions of behavior for a group are much more accurate and reliable than for an individual. A certain degree of accuracy can be achieved in looking at individuals, both humans and languages, but it can be a mistake to pigeonhole

them. Since one cannot ever know all forms of all languages in their histories, it is impossible to be entirely sure of any "universal" statements. Lass (1986) points out somewhat callously that one or two well placed nuclear explosives would remove any language without labials, so that one would have a "universal", that all languages *must* have labial stops.

Whatever the results of application of typological methods to reconstruction may be, comparative reconstruction should take priority in a step by step reconstruction of a proto-language. Thus, even if a reconstruction is changed to fit typological patterns, at an initial stage of the reconstruction one must use and define the structures achieved by the primary methods. Haider (1985:5) claims that at best typology can render a reconstruction less probable. But should one not prefer more probable to less probable solutions? However, care must be taken to avoid circular reasoning in using typology; for example, in claiming that Indo-European has no /b/, or roots with the sequence of two voiced, non-homorganic consonants, etymologists may then start discounting real evidence for these very patterns (Meid 1989; cf. also recent etymological dictionaries).

A further problem arises in reconstruction using typology when a system is reconstructed *in toto* as in one of the daughter languages. Let us take as an example the Indo-European present active and middle endings in the indicative singular. If a reconstruction were based on Sanskrit alone, then the forms would be:⁷

Active	1	2	3
	<i>*-mi</i>	<i>*-si</i>	<i>*-ti</i>
Middle	1	2	3
	<i>*-Vi</i>	<i>*-sVi</i>	<i>*-tVi</i> ⁸

What is wrong with this kind of reconstruction? It is possible since it belongs to the attested types (whether they show any patterns of implicature is not relevant). There are, however, two main ways to criticize it. First, if the comparative evidence from other languages is brought into play, the reconstruction will lose or change some of its features. Thus, for example, the first singular middle *-Vi* would have to be eliminated as uncertain because it is irreconcilable with Greek:

⁷μαι

⁸These forms give Sanskrit primacy in the inventory of morphological categories and forms; however, the forms are reconstructed using knowledge of extra-Indic phonology.

⁸Here V can represent *a, *e, or *o.

Second, although this is not the case above, if the system were typologically unusual (= unstable?) even in the attested daughter language, then the projection of the unstable or unusual system into the past would be made unlikely. Greek (Mycenaean) illustrates the problem. At the stage in which Mycenaean is attested, there seem to be few or no examples of the phoneme /b/, a typologically unusual state of affairs, for /b/ is the least marked⁹ of the voiced consonants (cf. Chapter 4) and its lack in an inventory which includes /g/ and /d/ is so unusual that one must explain its absence. That the system is unstable can be seen in the fact that between Mycenaean and Alphabetic Greek an entire category of sounds, the labio-velars, changed; and it is into /b/ that some of them changed, filling up the gap in the inventory. To explain the absence of /b/ in Mycenaean one must either reconstruct an unstable and unusual situation (i.e. without a /b/), determine where all the /b/ phonemes went to, or reconstruct the system in such a manner as to expect a gap in the inventory in this place. As will be discussed further in Chapter 4, it is precisely this last choice which Gamkrelidze & Ivanov (1973) and Hopper (1973) have made, reconstructing the entire obstruent inventory of Proto-Indo-European with different feature specifications. The absence of /b/ is replaced by an absence of /p'/, i.e. a glottalized labial obstruent, by Gamkrelidze & Ivanov. According to their reasoning, this is the most marked of the glottalized stops and hence the most likely to be missing.

Anderson (1992:334) notes that "...people who say they are doing 'typology' often are more concerned with catalogs of surface phenomena than with explanatory frameworks..." He suggests that in fact typologists and 'theorists' are looking for the same thing, a deeper understanding of linguistic structures and motivations behind them (Anderson 1992:324-325). Be that as it may, when reconstructing a specific proto-language, one is very much concerned with the surface structures; in fact, that may well be all that is reconstructible, for the data used to make the reconstruction are themselves surface features of the daughter languages (cf. especially Marchand 1988; Bailey 1987).¹⁰

5.0 Conclusion

In the following chapters I will look at problems in the reconstruction of Indo-European phonology and morphology from the viewpoint of typology. Although a reconstruction must rest on the basis of a formulaic stage, an attempt to approach each linguistic area of Proto-Indo-European from a comparative and typological perspective would represent the writing of a major new Indo-European grammar. Hence, I will first take a number of selected problems, describe the systems that have been proposed without delving into their philological foundations, then I will discuss them typologically. Because typology in its broadest sense is the study of what real languages do, the subject matter is virtually unlimited and the literature immense. Similarly, the literature on the

⁹Cf. Chapter 2 for a brief discussion of markedness.

¹⁰Cf. however, Chapter 4, § 1.0 on phonetic vs. phonemic reconstruction.

reconstruction of the grammatical and phonological categories of Indo-European is huge. I could not hope to cover more than a small fraction of both these literatures.

What areas are relevant for such a study? Phonology is best reconstructible for a proto-language and has also been well examined and catalogued by typologists and Indo-Europeanists alike. Chapter 4, thus, covers phonological problems of inventory, rule systems, accuracy, and change. After defining patterns of morphological typology in Chapter 5, they will be applied to some of the key problems in reconstructing Proto-Indo-European. Chapter 6 looks at the reconstruction of Indo-European case, and Chapter 7 at the Indo-European verb. For reasons noted previously, Chapter 2, §3.0, I do not attempt to cover syntax or semantics here except in reference to the above categories.

Chapter 4

Indo-European Phonology

For your information, the Indo-European proto-language had 1 (one) vowel, no consonants, 2 fundamental accents, and 26 (twenty-six) converted accents.
Those were glorious times!

L. Hjelmslev 1937 (cited after Whitfield 1980:41)

1.0 Introduction

Typology has been used more or less explicitly in reconstructing Proto-Indo-European phonology since the earliest attempts in the 19th century. Change typology was then used to help decide which possible proto-forms were more likely to develop into the attested reflexes. The degree of probable accuracy of reconstructions can be checked with typology for phonological inventories and rule systems. If there are sufficiently many abberencies in a reconstruction, the typological framework offers ways to revise it.

Inventory issues include the general question of the vowel and consonant inventory and specific problems such as the number of velars, the presence of **a*, the relationship of vowels to laryngeals, whether three or four series of consonants distinguished for voice and aspiration exist, and what the phonetic realization of these consonants will be.

Rule system problems include root consonantal cooccurrence restrictions as well as the application of change typology to the transition from whatever inventory is reconstructed to the actual attested inventories.

2.0 Typology of Vowels

The most common compilations of phonological universals are of inventory types. Thus, some languages are defined as three vowelized, some as five vowelized (cf. Ruhlen 1975, Crothers 1978, Maddieson 1984). One may also list phonological implicational universals as inventories and rules, or as Ferguson (1990:60) puts it: representations vs. rules.

The clearest classifications of vowel inventories can be made for the short vowel system (Crothers 1978). Long vowels are only present when contrasted with short ones, an analytical implicature (cf. below, §2.1.2). Crothers gives the following set of hierarchical orderings of short vowels (1978:136-7):

- 1.) All languages have /i a u/.
- 2.) All languages with four or more vowels have /i/ or /e/.
- 3.) Languages with five or more vowels have /e/. They generally also have /ə/.
- 4.) Languages with six or more vowels have /ə/ and also either /i/ or /e/, generally the former.
- 8.) A contrast between five basic vowel qualities is the norm for human language, and in general, the most common systems are those with close to this number of basic vowels.

He summarizes the smallest types of short vowel inventories as:

- 3 vowels: i a u
- 4 vowels: i e/a a u
- 5 vowels: i e a ɔ u/u

That all languages have a minimum set of three vowels is an unrestricted universal. A statistically strong implicational universal is that if a language has /ɔ/, it will also have /ɛ/. A weak statistical universal is that more languages have five vowels than any other inventory. An idiosyncrasy would be for L₁ to have four vowels whereas L₂ has five.

2.1 Problems of Indo-European Vocalism

The first reconstructions of the vowel inventory of Proto-Indo-European were based heavily on Indic and reflected the high occurrence in that language of the vowel /a/. Until the last decades of the 19th century it was believed that languages followed a regular developmental sequence which mirrored the pattern of cultural development (cf. Benware 1974). The evolution of morphological type

isolating → inflecting → agglutinative

was a reflection of a literary evolution

mythical → epic → prose.

A language's type was determined by its speakers' *Sprachgeist* which in turn was a reflection of their cultural level. The vowel triangle



was considered more basic than other configurations. This was in part because the oldest attested Indo-European language, Sanskrit, had precisely this vowel inventory as did Gothic, the oldest attested Germanic language.¹ Although, initially, no proto-language was constructed, nonetheless, the origin of the five vowel systems of Greek and Latin had to be explained. Two major schools of thought dealt with the problem. The changes resulting in Greek and Latin /e/ and

¹In fact, Gothic has a five vowel system. /e/ and /o/ are written <ai> and <au> (cf. Krause 1968:67). Sanskrit also has <e> and <o> which come from original or sandhi created diphthongs /ai/ and /au/. These vowels are considered long in meter; however, one wonders whether this might to some extent be a historicizing usage. If so, then Sanskrit would also have a five vowel system.

/o/ were either "mechanical" or "dynamic." If dynamic, then the individual sound changes were directly linked to meaning (e.g., *trinken*, *trank*, *getrunken*); if mechanical, they were non-functional,² phonetic differences (e.g., *Trank*, *Trunk*; cf. Bechtel 1892 on Schleicher and his method of *Abstufung*; also Benware 1974:49-50).

Typologically, the synchronic validity of this reconstruction was beyond doubt, for it does occur in Sanskrit and Gothic (depending on how Skt. <e> and <o> or Go. <ai> and <aʊ> are interpreted, of course). However, in the 19th century, this reconstruction was called into question, on typological grounds. The problem lay not so much in the synchronic reconstruction as in the reconstruction down to the daughter languages. This reconstruction would require changes in, e.g., Greek which seemed "unnatural". If one accepts the concept of uniformitarianism in linguistics (cf. Chapter 1, §5.0), then the changes from Proto-Indo-European to Greek or Latin must be the same types of changes that occur in other languages and occur with the same motivations and within the same types of contexts. Uniformitarianism invalidates the notion of an evolutionary development of all languages from a three vowel basic system to others, claiming instead that any system may lead to another, given proper circumstances and regardless of "cultural development." The eventual recognition of the law of palatalis in Indo-Iranian gave clinching formal support for a revision of the vowel system towards one closer to that of Greek.

2.1.1 Indo-European Short Vowels

Mayrhofer represents a recent handbook attempt at a coherent picture of the entire system of Indo-European vocalism; here the short vowel system (1986:90):

i	u
e	o
a	

However, this is not the only proposal. There are a number of reconstructions of the Proto-Indo-European short vowel inventory including (cf. Szemerédy 1972:126-127):

1 vowel:	*e
2 vowels:	*e *o
3 vowels:	*e *a *o
4 vowels:	*e *ə *a *o
5 vowels:	*i *e *a *o *u
6 vowels:	*i *e *a *o *u *ə

²Non-functional = non-productive derivationally.

In the following each of these patterns will be briefly described and then all will be evaluated using typological criteria.

One Short Vowel
e

The reconstruction of only one vowel in Indo-European is done by assuming that all other vowel colors are due to the influence of neighboring laryngeals (cf. §3.1.2). This theory never met with much acceptance and is generally considered safely done away with (Mayrhofer 1986; Szemerényi 1990:143-5)

Two Short Vowels
e o

Beekees has recently supported this system for Proto-Indo-European (1990:160). These vowels both have long counterparts. As in the system of one short vowel, all other vowel qualities arise from interaction with laryngeals. The alternation e/o is morphologically the basis of all Ablaut.

Three Short Vowels
e o
a

The difference between a two and three vowel system is the presence or absence of phonemic *a, i.e. whether *a existed independently or was always the result of laryngeal influence (cf. Wyatt 1970; Polomé 1972).³ Lubotsky (1989) disputes the reconstruction of any *a and tries to explain away instances of *a with laryngeals or as other secondary developments. Beekees (1990:173) considers all *a's to be in loanwords and expressive words whereas in word initial position and in verb endings:

*H₂e- → *a

Szemerényi argues, however, that not all *a's can be explained away with laryngeals (1990:143-144). In fact, as an explanatory model, one can easily insert laryngeals wherever they are helpful (§3.1.2; cf. Schwink 1992:187), but there is little doubt that there is sufficient formal evidence for a comparative reconstruction of *a.

³That is to say: must all instances which are reconstructible as *a be further analyzed as the result of laryngeal plus *o or *e even if there is no additional corroboration for this reconstruction using comparative or internal reconstruction?

Four Short Vowels

e	o
ə	
a	

This is the system used *inter alia* by Hirt (1921). The schwa *ə was proposed to account for a number of irreconcilable reflexes in different daughter languages (Szemerényi 1990:40), not because the daughters actually had this vowel. According to one view, *ə only exists as the destressed realization of a full vowel (or as the product of a non-syllabifiable laryngeal). Understanding its phonemic status depends on the causes of vowel gradation (i.e. Ablaut). If, for example, Ablaut was originally stress based, then the reduced grade may be an underlying full vowel and *ə should be eliminated from the phonemic description of the language. Further, it is possible that different stages in the proto-language may be needed to account for the vowel's origin and later status.⁴

Five Short Vowels

i	u
e	o
a	

This system has been supported recently by Mayrhofer (1986:90) and Szemerényi (1990:145). The difference between it and the three vowel system is in the analysis of the two high vowels as vocalic phonemes rather than as allophones of consonants.

The segments *[i] and *[u] are universally reconstructed for Proto-Indo-European, but opinions are divided on whether they are in allophonic distribution with [i] and [y]. Further, if they are in complementary distribution, what is the archiphoneme and where is its place in the system? Lehmann (1952:10-14), for example, has spoken in favor of allophonic distribution, for which reason he only reconstructs 4 short vowels.

⁴In traditional reconstructions of Indo-European, a pitch accent was used (Lehmann 1952:9; cf. Szemerényi 1990:75ff.). The interaction of vowel quantity, accent, and intonation seems typologically impossible (Szemerényi 1990:81). As Joe Salmons has pointed out to me (1992, p.c.), languages with pitch accent may reduce unstressed syllables (e.g., Mixtec). However, pitch should not affect the quality of vowels (i.e. qualitative as opposed to quantitative Ablaut). This accent's effect on vowel quality seems unmotivated unless one assumes a prior period of stress accent and the reinterpretation of a phonetic change (caused by accent) as an independent morphological process (Ablaut). This shows again the problem of seemingly unmotivated patterns being the result of earlier motivated and typologically relevant ones; or rather, unusual patterns may arise from the semantic/morphological use of phonological processes or of the results of phonological processes. For discussions of problems of accent and typology, I refer the reader to Salmons (1992) and Ratliff (1992).

Mayrhofer, on the other hand, shows that at least in some instances, [i] and [i:] behave differently and are in non-complementary distribution (1986:160ff; cf. also Szemerényi 1990:144). If Mayrhofer is correct, then */i/ must be added to the inventory. Whether all [i:]'s are allophones of /i/ is an entirely different question and not significant in the establishment of the vowel inventory.

Six Short Vowels

i		u
e	ə	o
	a	

This system is a combination of the previous one with the four vowel system and stands or falls on the same basis as those two (cf. Szemerényi 1990:40, 72).

2.1.1.1 Typological Considerations

In traditional analysis of the Indo-European short vowel system, disagreement generally centers on the interpretation of the inventory, less on the actual components. The main points of contention are the absence or presence of *a and/or *o; the presence of a destressed vowel (and its relation to laryngeals), and the interpretation of *i and *u in the system. Typology may be used here to evaluate the conflicting proposals. Evaluation using strong universals can be made by asking, e.g., with what frequency a reconstructed inventory occurs in the world's languages. When evaluating the reconstruction using implicational universals one may suggest, e.g., that if a particular segment can be reconstructed, then any lower segment(s) in an implicational hierarchy must also be reconstructed. In terms of statistical probabilities, if a weak universal indicates that most languages fit a specific pattern, then the proto-language is statistically expected to fit that pattern, too. For example, if languages optimally tend towards five vowel systems, then all things being equal (which they never are!), this is the more likely system in the proto-language. This last claim is *not* strong evidence for revision of a reconstruction, but as weak evidence it ought to be noted.

One vowel Indo-European violates an apparent absolute universal of vowel inventories and should therefore be rejected as highly unrealistic. Jakobson had pointed out the model's typological unusualness (1958; note Allen's critical response in the same year; cf. Szemerényi 1967, 1990:145; Polomé 1972:249). Kuipers (1968) reacted vociferously and with typological arguments to the opponents of a one vowel system. In Kabardian, a Caucasian language, Kuipers claims to find one or no vowels. The actually occurring vowels are described as features of the neighboring consonants. However, this avocalic analysis is only valid on the level of description (Halle 1970); Kabardian does have vowels. Crothers (1978) analyzes Kabardian as having five short vowels and two overshort

vowels.⁵ Two vowel Indo-European violates the same absolute universal. Using yet another interpretation of Kabardian data, Pulleyblank (1965, 1993) redefines these two vowels as *[e, o] but */ə, a/ that is to say, he posits a vertical distinction within the vowel system without reference to front or back. However, Crothers' interpretation effectively discounts this redefinition.

A three vowel Indo-European is one with the lowest number of phonemes that unrestricted universals seem to allow. However, the type of three vowel Indo-European which is generally reconstructed, i.e. *e*a*o, does not fit the pattern /i a u/ and should therefore also be rejected. One might argue that in a three vowel system you will find low allophones and that a reconstruction is overly phonetic. Indeed, if one interprets these three vowels as phonemically */i u a/ but phonetically *[e o a], the violation of the universal is eliminated; however, there are already other vowels filling the high slots (cf. directly below).

Four vowel Indo-European is criticizable for the same reasons as three vowel Indo-European. Further, according to Crothers (1978), reduced vowels do not properly belong under consideration when the typologies of short vowel systems are being determined. Of course, four vowel systems are possible, cf. Germanic with distinction of */i e a u/ in the short vowel system, but not in the proposed configuration. Six vowel Indo-European also contains the destressed vowel and should more correctly be reanalyzed as a five vowel system, identical to that given by Mayrhofer (1986:90).

Five vowel Indo-European is the only reconstruction which fits general typological criteria for probability and plausibility. In terms of unrestricted universals, it contains the absolute minimum vowels /i a u/. Weak comparative evidence for *a is effectively counterbalanced by strong typological evidence for its existence. Further, because */o/ can be reconstructed, it follows through an implicational universal that */e/ will also be present (§2.0, no. 3). Typological (and comparative) evidence shows that */i/ and */u/ should be reconstructed as vowels. For example, in a comparison of the roles of syllabic and non-syllabic segments in Indo-European and Micmac, Hewson (1984:379-380) claims that "When a language extensively exploits a set of phonemes in both syllabic and non-syllabic roles, it is likely that this set will be made up on the one hand of high vowels with non-syllabic allophones (glides) and on the other hand of resonants with syllabic allophones." Acceptance of this implies that Indo-European had /i, u/ with allophonic [i,u]. Hewson does not indicate, however, how strong his generalization is and Pulleyblank (1993:67) exploits apparent exceptions to the universal to support his reconstruction. Relevant here is also

⁵Of course, if the two vowel analysis of Kabardian data is correct, then the universal is shown to be merely very strong instead of absolute. This universal is not definitional anyway. Similarly, if a language should turn up with only one vowel, it would reduce the strength of the universal prohibiting such languages to a certain extent. Nonetheless, the principle remains that a reconstruction which is in violation of a very strong universal must be viewed with distrust.

the interpretation of sonant behavior and Siever's law. Some would say that the distributional data and application of Siever's law make the consonantal interpretation necessary. However, because the presence of these vocalic phonemes seems to be an absolute universal, on the scale of reconstructibility and typological strength, this may be an instance where typological data supersede formal data. Finally, the five vowel inventory is the most common in languages of the world and the most likely to be encountered; but this is weak evidence at best.

2.1.2 Long Vowels

There is a weak universal that a language's short and long vowel systems will be the same (Crothers 1978:123). Sometimes one or the other system will be larger. Long vowels tend also to be phonetically different from the short vowels. Usually, the long vowels are less tense than their short counterparts. However, the phonetic differences are of little relevance for the recovery of the phonemic inventory.

Mayrhofer reconstructs the Proto-Indo-European long vowel phonemes as (1986:90):

\bar{i}	\bar{u}
\bar{e}	\bar{o}
\bar{a}	

Others have suggested that all long vowels in Indo-European derive from short vowels followed by laryngeal (cf. Beekes 1990:175), i.e.:

$$\begin{array}{lll} i + H & \rightarrow & \bar{i} \\ u + H & \rightarrow & \bar{u} \\ e + H_2 & \rightarrow & \bar{a} \end{array}$$

or from a process of compensatory lengthening, for example, in consonant stems which have lost a nominative *-s (cf. Szemerényi 1990:118ff.). Whatever their origin, their existence in Indo-European seems acceptable and not in violation of any universal. If there are 5 long and 5 short vowels, then a weak universal is followed.

An interesting insight into the long vowel system may be found by looking at Crothers' analysis of Kabardian (1978). While Kabardian may be analyzed as having two short vowels and five long vowels, making its short vowel system unique or at least very unusual, Crothers reinterprets its vowel inventory as having five short vowels and two overshort vowels. If such be the case, then the inventory fits in with known universal patterns. One might conceivably use a similar reinterpretation in looking at Indo-European. The Indo-European "long" vowel system of five components could be interpreted as a short vowel system and

the "short" vowels as overshort.⁶ Then the typological objections (though not the formal ones!) to the smaller "short" vowel inventories would lose their validity. An objection to such an analysis of Indo-European "long" vowels is the importance of "short" *e and *o in morphology, i.e. in qualitative Ablaut: *e : *o .

3.0 Typology of Consonants

Croft (1990:148) summarizes the primary patterns of consonantal hierarchy as:

- 1.) Voiced implosives and plosives: velar ⊃ dental/alveolar ⊃ bilabial
- 2.) Voiceless ejectives: bilabial ⊃ dental/alveolar ⊃ velar
- 3.) Voiceless plosives: bilabial ⊃ velar ⊃ dental/alveolar
- 4.) Nasals: velar ⊃ labial ⊃ dental/alveolar

In this notation, the items on the right are least marked, the items on the left most marked and most likely to be missing. For example, of the voiced plosives, Dutch has /b/ and /d/ but is missing /g/.⁷ There are exceptions to all of these hierarchies in Maddieson's (1984) compilation of phonological patterns, but their degree of compliance is high. For example, the universal $m \supset n$ holds 99.3% of the time in Maddieson, i.e. in 297 of 299 languages (Croft 1990).

Absolute universal: all languages have consonants; strong implicational universal: if /d^h/ then /t^h/; idiosyncrasy: English has a phoneme /χ/.

3.1 Problems of Indo-European Consonants

In the following sections we will look at the problems of the Indo-European inventory of velars, the laryngeals, *[s - z], and the Glottalic Theory. All of these issues have been discussed in the past from a typological perspective (especially the Glottalic Theory) and they provide interesting examples of how typology can and cannot be used.

Here follows a listing of several recent views on the inventory of Indo-European consonants. The labels of the sources have been maintained in English equivalents.

⁶Cf. also Proto-Bantu which had seven vowels with a distinction of tense/lax. In Ciluba, the distinction is maintained whereas in Swahili it coalesces into five vowels. The difference between long and short vowels may be of relative tenseness/laxness or of moraic structure. Autosegmental approaches to phonology make use of a notation <VV> for long vowels, implying that they are actually monosyllabic clusters of two short vowels. Perhaps we could use a less loaded terminology such as Vowel System A (i.e. "short" vowels) and Vowel System B (i.e. "long" vowels). The universals of vowel patterns discussed here seem to be valid for a language's System A, not B. In Kabardian (and Indo-European??) a five vowel system was analyzed as a System B when it is in fact a System A.

⁷Orthographic <g> is actually /ɣ/. [g] occurs allophonically from /k/, e.g., *zakdoek* > *zagdoek*.

Szemerényi (1990:71)

	stops			
labials	b	p	bh	ph
dentals	d	t	dh	th
palatals	g'	k'	g'ʰ	k'ʰ
velars	g	k	gh	kh
labiovelars	gʷ	kʷ	gʷʰ	kʷʰ
	nasals		liquids	
dentals	n		l	y
palatals	m		r	w
	semivowels		spirants	

Beeckes (1990:160)

labials	p	b	bʰ
dentals	t	d	dʰ
palatals	k	g	gʰ
velars?	k	g	gʰ
labiovelars	kʷ	gʷ	gʷʰ
fricative	s		
laryngeals	h₁	h₂	h₃
liquids	r	l	
nasals	m	n	
semivowels	i	u	

Gamkrelidze & Ivanov (1984:143)⁸

I	II	III
(p')	b[ʰ]	p[ʰ]
t'	d[ʰ]	t[ʰ]
k'	g[ʰ]	k[ʰ]
ꝑ'	ꝑ[ʰ]	ꝑ[ʰ]
k'ʷ	g[ʰ]ʷ	k[ʰ]ʷ

3.1.1.0 Velars

In traditional reconstructions of Indo-European there are velar consonants with phonemic aspiration, palatalization, and/or labialization. The data of the Indo-European languages do not permit the reconstruction of only two articulatory distinctions among the velar consonants (aside from voicing). So-called *satem* languages exhibit

k - s - k

⁸For Gamkrelidze & Ivanov only their reconstruction of the obstruents is given here. Note that whereas Szemerényi uses the apostrophe to mark palatalization, Gamkrelidze & Ivanov use it to mark glottalization.

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where *centum* languages have

$$k - k - k^W.$$

Without internal analysis the only reconstruction allowable has three proto-phonemes. This was done quite early with a resulting Indo-European **k*, **ḱ*, **k^W*.

$$\begin{array}{ccc} *k - *\dot{k} - *k^W \\ \downarrow \\ k - s - k & & k - k - k^W \\ (\text{satem}) & & (\text{centum}) \end{array}$$

That three consonants may logically develop into these attested reflexes is shown by Romani where Indic *s*, *s'*, and *ʂ* have developed in European and Syrian dialects in a similar distribution (cf. Mayrhofer 1986:103; Anttila 1989:243-245):

$$\begin{array}{ccc} s - \dot{s} - \dot{\$} \\ \downarrow \\ s - \dot{s} - \dot{\$} & & s - s - \$ \\ (\text{European}) & & (\text{Syrian}) \end{array}$$

The large number of velars has bothered linguists so that they have tried to explain the situation using just two velar articulations. The two main schools are represented by Meillet (1937):

$$\begin{array}{l} *k - *k^W \\ *g - *g^W \\ *g^h - *g^{Wh} \end{array}$$

and Kuryłowicz (1935):

$$\begin{array}{l} *k - *\dot{k} \\ *g - *\dot{g} \\ *g^h - *\dot{g}^h \end{array}$$

(cf. Lehmann 1952:100). Lehmann, following Meillet, proposes that all the palatalized velars derive from original sequences of /*ke/ (i.e. **k* → *ḱ* / __ e) and then spread analogically because of the alternation of *e/o in Ablaut. In those languages where *e and *o fell together, the palatalization became phonemic. Later, the labiovelar articulations "became non-significant" and were independently simplified in each language to simple velars. He justifies his claim by noting the rarity or absence of evidence for *ḱa*, *ḱo*, *ke* (1952:101). Mayrhofer (1986:104) considers a positionally conditioned development of palatalized velars

possible but unprovable. He cites Kuryłowicz' criticism that the sort of analogical spread proposed by Lehmann is impossible so long as there is allophonic distribution of velars. Thereafter, there is no reason for a spread. Given also the fact that at least traces of a three-way distinction of velars are present in Albanian, Armenian (Winter 1965), and other languages (Szemerényi 1990:68; Melchert 1987;⁹ Morpurgo Davies & Hawkins 1988; Откупщикин 1989; Tischler 1989:429);, most scholars reconstruct a three-way distinction for Indo-European on the basis of formal evidence.

If three different velars are reconstructed, the status of the labiovelars is not entirely clear. Are they mono- or diphonemic? Szemerényi (1990:69) argues for the former, citing as the most important datum the fact that a sequence $*k^w ek^w lo-$ 'wheel' is possible, i.e. $*-k^w C-$ whereas except for $*k = C_1$, any other three consonantal cluster $-C_1 w C_2-$ is impossible (e.g. $**-dwI-, -twI-, -twn-$ etc.). However, this is a problem of syllabification rules. By proposing that $*k$ may be syllabified with $*w$, Szemerényi's objection loses explanatory power, for then the above cluster is explained without specifying the phonemic status of $*k + w$. A rule syllabifying /k + w/ together would have to apply before the vocalization of semivowels in unsyllabifiable position (i.e. to avoid $**kwekwlo- \rightarrow **kwekulo-$). Whether such a tautosyllabic $*kw$ would become $*k^w$ is a moot point, given that even the evidence in Latin is unclear.

Szemerényi's claim (1990:63) that the labial and velar elements are of equal importance because of the Greek developments into labials or velars is weakened when one considers the physical form of labiovelars. The phonetic mapping of a sound may be radically different for two different sounds, even though an analysis of their formants and sound structure shows them to be very close. This is important for the reconstruction of phases of change as well as the nature of sound shifts. In Greek, the labiovelars developed in complementary distribution into labials, velars, or dentals. The mapping of these sounds in the different environments may have been reinterpreted by learners as representing altogether different articulations and may have brought about the shift.¹⁰

3.1.1.1 Typological Interpretation

The two possible inventory types defined by Meillet and Kuryłowicz are common and the use of typology has little to add. The three way distinction of velar, palatalized velar, and labiovelar has been considered troublesome because it is so large. This troublesomeness would only be problematic if this reconstructed inventory were unique; then typology could support the two velar series of Meillet or Kuryłowicz. However, three way inventories do occur, for

⁹Note the forms *asu(wa)* or *azu(wa)* 'Pferd' (Tischler 1989:429). One might wonder about the possible influence of satem speaking Mitanni Aryans and borrowing of equestrian terminology.

¹⁰A further problem is the differing treatment of $*kw$ or $*k^w$ as π or $\pi\pi$ in Greek with no apparent justification. Cf. also Greek *κύκλος*.

example, in the Iranian language Yazghulami (Szemerényi 1990:63); but they appear to be rare: a statistical universal. As such its violation in Indo-European carries only a little weight in evaluating this reconstruction; the formal evidence for a three way distinction is stronger. Because the inventory of consonants is larger than the inventory of vowels, universals of inventory there will be in general weaker than for vowels. This is in accordance with the fact that smaller sets tend to have more clearly definable patternings which are better delimited.

3.1.2. Laryngeal Theory

19th century work on the Indo-European vowel system led to the reconstruction of segments that were not attested *per se* in any of the daughter languages, the sonant nasals. Another reconstruction of non-surviving segments was that of the "laryngeals" made by de Saussure in his well known 1878 work, *Mémoire sur le système primitif des voyelles dans les langues indo-européennes*. The morphological patterns of Indo-European lead one to expect zero or reduced vowels where in fact Indo-Iranian has -i or long vowels. In Greek, a reduced grade would be realized as α ε ο. Saussure posited the presence of "coéfficients sonantiques", of some unknown element that would lengthen a preceding vowel, color *e to *o or *a, and when standing between consonants develop to Indo-Iranian i but Greek α ε ο. Although the theory was much discussed by following scholars, it was only the recognition of Hittite as an Indo-European language that provided us with surviving "laryngeals." Since then, the primary debate has been less on the reality of laryngeals in Indo-European than on their number and the ways in which they developed into the daughter languages. As Lehmann has pointed out (1990), even more traditional European scholars have now as a rule accepted at least some form of the laryngeal theory. Some, however, have made use of the "Zauberstab der Laryngaltheorie" to explain any puzzling pattern in Indo-European, thus, for example the Greek κ-perfect, the Germanic weak dental preterite, the Latin vi-perfect, Verschärfung, etc. so that a reaction has been to find any use of the theory suspicious. Part of the problem lies in the methodology used to postulate the laryngeals in the first place. If a label "X" is inserted into a proto-sequence of sounds in the positions where something inexplicable has occurred, this is fully justified and precisely comparable to the algebraic X's used in mathematics. In the case of the laryngeals (in those places where they are generally accepted), the X of the equation seems to correspond to an actual phoneme. However, as soon as each hypothetical X is equated with the new phoneme, trouble crops up, just as if in mathematics one were to label all unknown quantities with X and having found the value of X in one equation or set of equations one were then to insert this value for all X's without first demonstrating that all X's are equivalent.

The two predominant schools of thought on the number of laryngeal phonemes are "monolaryngealist" and "trilaryngealist" (Eichner 1988:124). The monolaryngealists accept these sounds for the proto-language; but because only Hellenic shows three reflexes, they consider it methodologically unacceptable to

posit more than one (following Meillet's maxim that evidence is needed from preferably three languages to reconstruct something for the proto-language). The trilaryngealists either consider the Greek evidence sufficient or attempt to show differing laryngeal reflexes in other languages than Greek (for example, **H*₃ in Indo-Iranian). A differing version of trilaryngealism is represented *inter alia* by Polomé (1985). This version reconstructs three laryngeals for Proto-Indo-European but considers only two necessary to explain the state of affairs in Anatolian and perhaps Armenian; only one laryngeal is needed for the other languages which show any reflexes of laryngeals. Even in Anatolian the inconsistencies in what are expected to be different laryngeal reflexes may be due to confusion after the collapse of three laryngeals. A fourth laryngeal is sometimes assumed (cf. Hamp 1988):

$$\begin{aligned} *H_2e &\rightarrow *a \\ *H_2o &\rightarrow *o \\ *H_4o/e &\rightarrow *a. \end{aligned}$$

Abstractionists ought to welcome laryngeals, for through them the system is simplified and made more formulaic (cf. Wyatt 1964:140-141). In much of the discussion of these segments, the problem of their phonetic status has been ignored, more attention being directed towards their location in lexical items and their numbers. Rather than discuss the various views for and against any particular number of laryngeals because of the comparative evidence, in the following I will discuss implications of views on the phonetic or phonemic realization of the laryngeals in a typological framework, i.e. in terms of inventory, developments, and rule systems.

3.1.2.1 Phonological Interpretation

Mayrhofer (1986:121) states:

Die Ansätze /*h*₁/, /*h*₂/, /*h*₃/ sollten in einer verantwortlichen Darstellung nur "algebraistisch" notiert werden; sie erweisen zwar durch unbestreitbare Fortwirkung ihre Existenz..., und es ist gesichert, daß sie zu den Konsonanten und mit hoher Wahrscheinlichkeit zu den Engelauten zählten.

He further states that although some phonological characteristics of these phonemes may be determined, they are not as precisely definable as other phonemes such as /s/ (Mayrhofer 1986:122).

In the following I look at two proposals for the phonological interpretation of laryngeals. I realize fully that there are many other possibilities and refer the reader to Polomé (1965), Bammesberger (1988), and Lindeman (1989) for a more complete discussion of the theory and its implications.

Lindeman (1989) gives the laryngeals phonetic realizations as voiced and voiceless dorsal fricatives:

Palatal	velar	labio-velar
x' = H ₁	x = H ₂	x^w = H ₃
γ' = H ₁	γ = H ₂	γ^w = H ₃

Beekes (1989, 1990) interprets the laryngeals phonetically as:

- H₁ = ? (glottal stop)
- H₂ = ʕ (pharyngeal)
- H₃ = ʕ^w (labialized pharyngeal)

3.1.2.2 Typological Interpretation

The laryngeal theory was first proposed to explain correspondences between vowels in different verbal forms. The problems were dealt with by postulating a set of phonemes whose presence made the post-proto-linguistic developments more regular. As long as these phonemes were not further interpreted (i.e. they were kept at a formulaic level), they could not be analyzed typologically. However, with any attempt to assign them specific values, they become part of the inventory and should be looked at using the same criteria to which other members are subjected.

Lindeman's (1989) analysis of a voiced and voiceless series of laryngeals is based on analogy to the velars. However, he fails to show that such a symmetry is called for typologically. He does point to languages which may have the same inventory as he reconstructs, but this only shows that the inventory is not impossible. Thus, active typological evidence in favor of the inventory is weak. The formal evidence for so many different laryngeals is also weak so that the entire reconstruction should be rated as improbable.

Beekes (1989, 1990) brings together data from several languages to show that his inventory is possible in the context of a larger set of consonants. He combines distributional data and diachronic developments to justify the interpretation. The distributional data (i.e. the evidence of other languages with similar inventories) are not very strong evidence. They merely prove that this inventory does not violate any absolute universal. The diachronic data are more important. They show a set of motivated sound changes involving the laryngeals, themselves, as well as the neighboring vowels; and these developments agree with proposed universals of change, albeit the formalization of these universals is still lacking.¹¹ The comparative evidence points most clearly to a set of three

¹¹This demonstrates again the problem which Ferguson (1990) has discussed, namely, the lack of a handy catalogue of change types, frequencies, and degree of universality. The material which Beekes adduces is well-motivated and "intuitively" convincing; yet one would like to get beyond the intuitive stage. As the analysis now stands, the listing of attested changes which are similar to what is proposed for Indo-European merely proves that the

laryngeals for the proto-language. For these reasons, Beekes' version of phonological interpretation is preferable to Lindeman's.

3.1.3 *[s - z]

A specifically phonetic distinction that is reconstructed for Indo-European is: */s/ vs. *[s - z]. A rule is reconstructed (Szemerényi 1990:52):

/s/ → [z] / ____ [+obstruent, +voice]

The classic example is Indo-European /*nisdos/ → [*nizdos] 'nest'. However, because in languages with the systematic oppositions assumed for Proto-Indo-European such an assimilation rule is common, physiologically well motivated, and to be expected in this environment, one could eliminate it from the proto-language because it would be expected to develop independently in the daughter languages. But, for similar reasons one might reinsert the rule into the proto-language because such a rule is common and follows statistical probabilities of what is to be expected in the proto-language. Heads I win, tails you lose!

3.1.4 The Glottalic Theory

Salmons' monograph (1993) on the Glottalic Theory renders much of what could legitimately follow here redundant. However, because much of the recent debate on the use of typology in reconstruction has resulted from the realization that the inventory of Proto-Indo-European stops (cf. §3.1) was typologically unusual, any treatment of the subject would be incomplete if it didn't touch on this issue.

In Brugmann's reconstruction, the Indo-European consonants were divided into four series by the features of voice and aspiration (cf. Szemerényi 1990:71), as exemplified here with the dentals:

*t - t^h - d - d^h

However, the voiceless aspirated stops have been shown to be post-Indo-European developments (cf. Hiersche 1964, Polomé 1972). This leaves a three way distinction of stops:

*t - d - d^h

This system was unappealing to Pedersen (1951) who proposed that the original Proto-Indo-European system must have been:

*t - d - t^h

change is not in violation of unrestricted universals; presumably, however, it is in accordance with other universals.

In Indo-European the system would have developed:

$$*t - d - t^h \rightarrow *d - t - d^h$$

Jakobson (1958) rejects out of hand such a reconstruction as *ad hoc*. He felt that the proto-language must conform to the rules of real languages and that the reconstruction should be revised somehow.

In the early 1970's, the desired revision of the Proto-Indo-European consonantal system was proposed independently by Hopper (1973) and Gamkrelidze & Ivanov (1973; cf. Salmons 1993:17 on contacts between them and the question of who was first; also Gamkrelidze 1976, 1981, 1987, 1989, 1990, 1992a & b). Their arguments are simple and based on the following "anomalies" in Proto-Indo-European:

- 1.) Proto-Indo-European *b is either missing or very rare.
- 2.) No known language has a series of voiced aspirates without having voiceless aspirates as well.
- 3.) Cooccurrence restrictions prohibit roots such as: *deg-, *dekh-, *tebh-.¹²

In response to these difficulties, Gamkrelidze & Ivanov (1973) and Hopper (1973) both proposed that a reconstruction of Indo-European with glottalized (Hopper: murmured), plain, and voiced stops would explain the anomalies.

Gamkrelidze & Ivanov support their claims with markedness criteria. As discussed in §3.0, in markedness theory, a more marked element is more likely to be absent than a less marked one. In the traditional inventory, several violations of this principle are evident. First, /b/ is the least marked of the voiced consonants and /g/ is the most marked. Normally, /g/ will only be present if /b/ is also present. Second, voiced aspirates are more marked than voiceless aspirates or voiced plain stops. Presence of voiced aspirates implies the presence of voiceless aspirates and voiced plain stops. However, the traditional reconstruction has voiced aspirates but not their voiceless counterparts.

The reinterpretation of consonants eliminates these anomalies:

- 1.) In languages with glottalized stops, the labial is the most marked and hence most likely to be missing.

¹²I again refer the reader to Salmons' excellent monograph (1993) for fuller discussion and evaluation of these root cooccurrence restrictions. He shows that they may not be as significant for the theory as originally assumed because of general patterns in the metrical structure of Indo-European phonology. Roots of the type *deg- are in fact listed in Pokorny, but they are vanishingly rare and are without exception of questionable reconstructibility because of only two-language attestation. There may also be some areal considerations which come into play for the Northwest of the Indogermania.

- 2.) The three way distinction, glottalized, plain, and voiced stops is well attested.
- 3.) Root cooccurrence restrictions are attested and motivated for the reinterpreted stop types.

Opponents of the Glottalic Theory generally argue that typology is not valid in reconstruction (cf. Chapter 3), or that the methods and data used to justify the reconstruction are not philologically or typologically valid. Ironically, many of those who object on philological grounds explicitly reject typology as a tool, yet use it implicitly to justify the older reconstruction.

The theory has the following tests to pass: Is Proto-Indo-European **b* really non-existent? Is the implicational universal about voiced aspirates correct? Is the structure of the Indo-European root as reconstructed by Benveniste valid? Are the developments from Proto-Indo-European to the attested languages more probable under the old or the new system?

3.1.4.1 **b*

In the daughter languages there are few or no examples of **b* which are clearly traceable to Proto-Indo-European. Yet, each of the languages which has a plain voiced series of stops has /b/. Indic, for example, has many occurrences of /b/ which are the output of Grassmann's Law of aspirate dissimilation, for example, **bhendh-* → *bandh-*. Greek has transformed its old labiovelar series into, *inter alia*, voiced labial stops. For example: Myc. *qo-o /gʷans/* → *βou̯s*. If one takes the Greek and Indic lack of original **b* as decisive, then the traditionally reconstructed system does violate a strong statistical universal. Meid (1989) tries to show that /b/ did exist, but the etymologies supporting his claim are very few in number and not in areas of core vocabulary so that scepticism is called for. Also, Wescott (1988) has attempted to demonstrate the presence of /b/ in affective vocabulary in Indo-European, but this is one of the most transitory of vocabulary areas so that his etymologies must be suspect. They do, however, raise the interesting question of how to determine what is and is not an inventory item. One thinks of the English use of click sounds or of implosives (e.g. *dumb* - [d̚ʌm]) in affective vocabulary or situations. Salmons (1993) argues cogently that the question of complete absence of /b/ as opposed to extreme rarity or use in only limited contexts is not relevant. Both situations are symptomatic of a violation of markedness relationships.

3.1.4.2 Voiced & Voiceless Aspirates

As Jakobson (1958) puts it, no language will have voiced aspirates without having the corresponding voiced stops and voiceless aspirated stops. While this is not an absolute universal, it is very strong statistically and has few violations.¹³

¹³To reiterate a point: in determining desirability of a reconstruction, one is commonly reduced to making not so much a choice of only one possibility, but rather making a ranking of

It would be illuminating to examine the history and future paths of languages with an inventory like that of traditional Indo-European to see how old the inventory is and how stable. Markedness theory implies that this system should presumably be highly unstable.

3.1.4.3 Indo-European Root Cooccurrence Restrictions

The cooccurrence restriction for two non-homorganic voiced consonants in a root under traditional reconstruction is not motivated; however, if the Glottalic Theory is accepted a sufficient motivation becomes apparent; and this may also provide evidence for diachronic stages in Proto-Indo-European (Schwink forth.a). In becoming Greek, Indic etc. these glottalic consonants became voiced stops whereas in Germanic they only lost their glottalization, becoming voiceless stops. However, the lexicon retained their original distribution so that the earlier phonologically motivated rule is replaced by an etymologically "motivated" rule which is open to violations.¹⁴ If verbal reduplication is relatively late in Indo-European, as has been claimed by Adrados and others, then it may ignore the general rule precluding cooccurrence of ejectives because they have changed to voiced stops. If the ejectives were still present, one would have expected either a dissimilation (as for example with even later Grassmann's dissimilation of cooccurring aspirated stops in Indo-Iranian and Hellenic), or a rejection of the reduplication. This idea makes the reconstruction of two stages of Indo-European virtually certain. Stage I had glottalized consonants and no verbal reduplication, Stage II lost the glottalic stops but introduced verbal reduplication.

This analysis of the root cooccurrence restrictions is dependent on Benveniste's proposal for root structure and this is itself probably too restrictive (cf. Mayrhofer 1987:95; Garrett 1991; Iverson & Salmons 1992; Salmons 1993). Further, following Iverson & Salmons (1992:313-4), Proto-Indo-European roots show a high preference for high sonority codas and a preference for sharing of the laryngeal manner of articulation features. This would make the cooccurrence restrictions motivated but take away their support of the Glottalic Theory.

3.1.4.4 Developments of the Glottalic System

several possibilities. The distribution of voiced and voiceless aspirates stops in the languages of the world is distinctly uniform in almost never having the traditionally reconstructed system. Because the typological model functions within a statistical framework, nothing can absolutely prove that Indo-European was not one of the uncommon language types. However, Occam's razor calls for ranking the more common language type over the uncommon one in a reconstruction. As Jasanoff pointed out at the 1992 UCLA Indo-European Conference, the proto-language was certainly just as obstreperous a creature as any language spoken today.

¹⁴Salmons would prefer to avoid reconstructing two stages of Indo-European, the earlier with glottalic consonants, the later with the traditionally reconstructed system, because making two stages would violate explanatory simplicity.

One objection raised about the development of the glottalized consonants has been that they should become voiced in so many languages when ejectives are almost universally voiceless. However, it is quite common to find a mixture of glottalic ejectives and glottalic implosives in language systems and also the development of one to the other. Glottalized ejectives will most likely develop into voiceless obstruents whereas glottalized implosives will become voiced (cf. Salmons 1993:53 with discussion and literature).

In Mycenaean Greek the consonantal system resembles the traditional reconstruction except that the "voiced aspirates" are voiceless. There is an unmotivated lack of /b/ which later is reintroduced into the system (cf. §3.1.4.1). If one assumes a change from glottalized to plain voiced stops, then the origin of this highly marked system and its later development are explained. The original system had a labial gap, as is normal for such series of glottalized consonants. When transformed, this normal gap became highly marked and undesirable so that it was quickly eliminated by other phonological changes, once again evidence that the systems which are typologically unusual are also unstable.

Troublesome for the Glottalic Theory is the chronology of sound change and loan word phonology (cf. Meid 1987). The word **r̥ks* in Celtic is loaned into Germanic as is proven by the vocalism. Under the traditional theory of consonantism, the term was borrowed after the Celtic change of *ē to *r̥. However, under the Glottalic Theory, the final consonant of the Proto-Indo-European stem would be *k' instead of *g, given the evidence of other languages. Under the traditional theory, Germanic borrowed the word after the Celtic shift of the vowel but before the Germanic consonant shift. Using the Glottalic Theory, Meid suggests that the chronology becomes a problem because the Celtic development of *k' as *g would not have given Germanic *k. However, if Germanic borrowed the *g before it had such a sound in its inventory, then it might easily have assigned the unknown Celtic sound to one of its own inventory units, all of which had no distinctive voice (Salmons 1993:24).

3.1.4.5 Evaluation

In terms of the scale of typological strength, the Glottalic Theory can be checked on a number of fronts. Because there are languages attested which have the abberant consonantal inventories which were ascribed to traditional Proto-Indo-European, no absolute universals are invoked. However, the gaps and distribution of the inventory violate several strong universals which are motivated in the physiology of speech production. This motivation is one of the strongest factors in favor of the theory. If the distributional unusualness of Proto-Indo-European consonants were not motivated, then it might conceivably be sheer coincidence that these particular gaps occur. The motivation proves that the traditional reconstruction is a marked, typologically undesirable pattern and not merely unusual.

As was noted, the Glottalic Theory spearheaded to a large extent the current debate on typology and reconstruction methodology. It incorporates well the

various problems involved in using the framework. The universals involved are not absolute so that opponents invoke the few exceptions as proof that the method is fallacious. However, the number of agreements of the new interpretations with both synchronic and diachronic patterns, if not *proving* the Glottalic Theory beyond all doubt, certainly put it high in probability. Of course, those opponents of the Glottalic Theory who follow a formulaic approach to the process of reconstruction in general are in a different business from the followers of the Theory who are attempting to capture some measure of realism.¹⁵

4.0 Conclusion

In this selection of problems in Proto-Indo-European phonology a range of applications of typology to reconstruction was observed. For the laryngeals, the inventory of the segments and their developments in the daughter languages are only derivable from the examination of segments which behave in the same way in other languages and the explanation of the differences in terms of what is known about languages. The vowel system shows two main problems, the inventory itself as an item (i.e. one vowel vs. three vowels etc. in Indo-European), and the analysis of an inventory item (i.e. the phonemic and inventory status of the high vowels and the distinction between long and short vowels). The Glottalic Theory integrates problems of rule systems (e.g., root cooccurrence restrictions), implicational structures (e.g., absence of glottalized labials if there are glottalized consonants), and inventory (three series of consonants as voiced, voiceless, and glottalized as attested vs. voiceless, voiced, and voiced aspirates as rare or unattested).

The further task for researchers in this area will remain the further discovery of phonological universals (or near universals) in synchrony and diachrony in attested languages, the explanation of motivation for these patterns, and the comparison of these data with the projected states and changes in Proto-Indo-European.

¹⁵In 1991 there was staged a "Great Debate" on the Glottalic Theory at the University of Texas at Austin between Robert D. King (pro) and Andrew Garrett (contra). Interestingly enough, neither of the "contenders" nor any of the audience brought up the issue of method in the acceptance or rejection of the Glottalic Theory. Rather, all seemed to accept the method tacitly as a given and were only concerned with the *how*.

Chapter 5 Morphology

"[S]ome members of some human communities have been observed to interact by means of vocal noises."

Member of a Linguistics Institute (cited by Fillmore 1968:1)

1.0 Introduction

A traditional grammar of an Indo-European language will have sections on phonology (i.e. phonetic, orthographic, historical description of the sound system), morphology (listings of forms and endings for the verb, noun, pronoun etc.), and syntax (description of usage of the raw materials previously outlined and definition of semantic functions). Despite the lack of structurally defined models of phonology and morphology, the early phonological and morphological reconstructionists were very productive and their results are still very much present in present day handbooks of Indo-European (cf. Winter 1984). Whereas the transfer of earlier works' terminology on phonology to more current studies is fairly frictionless, morphology is not always as tractable. This explains the need for the present chapter in which will be outlined how morphology is understood in this study and typological principles will be introduced which apply when reconstructing morphology. In particular, I will look at grammaticalization/morphologization as a typologically describable process, markedness patterns, synchronic ordering principles, and semantic universals in morphology.

2.0 Syntax, Morphology, and Semantics

The delineation of syntax and morphology is a complex problem, even more so the status of semantics and the lexicon in morphology. In traditional grammars of Indo-European languages, "morphology" is the paradigmatic listing of inflectional distinctions as well as the patterns of word derivatons. Syntax, on the other hand, is seen as "applied morphology" (Anderson 1992:360); and it includes those features of the morphology which are not easily described in paradigmatic manner.

With the rise in interest in syntax as an area of linguistic, rule-based knowledge, morphology dropped out of the limelight. Generative schools tended to reverse the earlier classification by relegating word formation to syntax. Thus, for example, Lehmann's *Proto-Indo-European Syntax* (1974a) is very much concerned with what more traditional terminologies would consider to be morphology.

In recent years, however, a recognition has been achieved that some features of "morphology" cannot be adequately accounted for in a purely syntactic framework. In a module-based understanding of linguistic processes, positing a morphological component, as distinct from syntax and phonology, makes it possible to describe surface structures as containing a minimum of non-

visible material. Anderson (1992) offers a fairly comprehensive overview of this understanding of morphology and its relation to syntax and phonology, and despite some reservations about his views on the significance of listed knowledge and lexicalization, I will be following him closely.

According to Anderson's model, the types of morphological processes are (1992:399-400):

- 1.) Derivation
- 2.) Inflection
- 3.) Compounding
- 4.) Cliticization

Except in compounding, the surface phenomena of a word which arise from the interaction with phonology and/or syntax are the result of applying word formation rules to a morphosyntactic representation during derivation. Morphology operates on stems/lexical items to produce other lexical stems which will eventually surface as words. The information in the morphosyntactic representation makes up the interface between the principles of syntax and of word formation (1992:91). Morphosyntactic representations make up the terminal nodes of phrase markers. A paradigm is the complete set of surface realizations from a stem via word formation rules. A word's derivational structure is, however, on the surface as obscure and unnecessary to speakers as its etymology; hence, Anderson dispenses with the traditional term "morpheme," replacing it with lexical items and word formation rules. I will continue to use the term "morpheme" here when referring to formal lexical items, whether "morphemes" exist as surface structures or not.

Inflectional morphology is that morphology which is accessible to and/or manipulated by syntactic rules (Anderson 1992:83). Derivational morphology differs from inflectional morphology in that it occurs in the lexicon and does not interface directly with the syntax. As such, it can produce stems which are modified inflectionally, but not vice versa. From this it follows that inflectional material always will occur outside of derivational material. Derivational rules refer to or manipulate "lexical category, syntactic subcategorization frame, semantics and argument structure" (1992:184). Word formation which is inflectional in one language may be derivational in another (1992:82). Finally, clitics are comparable to word level affixation at a phrasal level and should therefore always be outside of derivational and inflectional material.

Anderson admits here that it is unclear how much derivational material may be stored by any particular speaker as rules and processes and not lexicon but he generally seems to prefer rules (1992:194-195); yet this often may obscure the way in which material has accreted over history.

2.1 Semantic Prototypes and Morphology

Morphology itself is a rule based system and the rules proper are grammatical, not lexical. However, the relations which morphology expresses are in the real world; knowledge about relations represents a kind of semantic knowledge. Otherwise, it would not be possible to give prose analyses of the functions of a particular morphological category. Just as a derivation produces a new lexical entry (whether it is stored as a lexical entry or only as a possibility in the rule system doesn't really matter), so too inflectional processes will produce sets of words which are rule-related and semantically differentiated. As it turns out, the listings of cases which are so common when making a short synopsis of a language's grammar fit well into the concept of linguistic prototypes (cf. Chapter 2, §3.1).

When looking at the semantics of morphological categories, Taylor (1989) has suggested that a core-prototype of meaning can develop by extension or metaphor to a chain of secondary meanings in polysemy or eventual homophony. Meanings of separate morphological markers may and do coincide so that there may be, e.g., a genitive or dative of possession. Nonetheless, to take this example a step further, the core meaning of dative vs. genitive is different. Patterns of semantic extension tend to repeat themselves so that similar developments of semantics will occur independently, i.e. these are universals. One may take as an example the distribution of comitative and instrumental meaning in a set of related languages with surface case. Heine *et al.* (1991:103) state that instrumental meaning may develop out of comitative meaning but not the reverse. If two languages have formally identical case markers which denote the comitative in one language and the instrumental in the other, then the immediate solution is to reconstruct the proto-case marking as a comitative. It may also have had an instrumental meaning; the probability of this will depend on further data. By cataloguing the occurrences of semantic extension and of grammaticalization, the same statistical data may be compiled as for phonological inventories and, to a lesser extent, rule systems or change patterns.

3.0 Grammaticalization

A distinction exists between open and closed (or continuum of open/closed) semantic sets. Some sets are restricted in scope because of physical (i.e. non-linguistic facts). Others are rather open-ended for the same reasons. Thus, there is a closed set of terms for human body parts but a cognitively open set of numerical expressions. One kind of closed set is "grammatical function words" (or "lexical morphemes," e.g., adpositions). Croft (1990:189-190) makes a distinction between these and "grammatical morphemes":

Grammatical Function Words

- free
- open set
- usually optional

Grammatical Morphemes

- bound
- closed set
- generally obligatory

Croft proposes that the two classes are prototypically distinguished in terms of these three defining characteristics. For a morpheme to be assigned to one or the other class, it must agree with two of the three criteria. In terms of Anderson (1992), lexical morphemes are interpreted at the phrasal level; grammatical morphemes are subject to the word formation rules. Lexical morphemes are late to be mapped, grammatical morphemes early; clitics as a subset of grammatical morphemes are mapped as morphology during phrasal derivation. Lexical morphemes may develop into grammatical morphemes: morphologization or grammaticalization.

Recent work on grammaticalization holds special promise for work on the reconstruction of Proto-Indo-European morphology (cf., e.g., Hettrich 1991, Bauer 1992:170-175). The model of grammaticalization I follow here is essentially that of Heine *et al.* (1991). They define grammaticalization as the transition of semantically concrete elements to ever greater abstractness with a corresponding loss of independence as semantic units. The process is termed "bleaching out" of semantic content. The cycle of grammaticalization is from concrete lexical item to grammaticalized functional marker to lexicalized morpheme part; or following the older truism, today's syntax is tomorrow's morphology. Anderson argues that this is not completely accurate (1992:348ff.). The position of originally independent words may not reflect the original syntax of a language or its most basic form. New morphology can also come about when originally phonologically or syntactically conditioned alternations are morphologized.

Morphological change by proportional analogy is best described as the elimination of more specific rules (i.e. word formation rules which apply earlier) and extension of general rules. Splits may occur (e.g., *brothers* vs. *brethren*) when the output of a specific rule is lexicalized in a separate meaning before the extension of the more general rule takes place. One possible course of development for case morphemes might look like this:

- Stage 1. X # Y (syntactic collocation)
- Stage 2. X + Y (grammaticalized morphological marker)
- Stage 3. XY (lexicalized item containing formerly independent components)¹

Or in more specific terms:

- Stage 1. Noun # Postposition
- Stage 2. Noun + case suffix
- Stage 3. Lexeme (perhaps adverb with fossilized case marker)

¹The use of # and + does not necessarily mean that these are surface boundaries; rather, they indicate where in an analysis one might assume syntactic or word formation rules to apply or not.

Most interesting in this context is evidence for the directionality of the semantic changes involved and the general sources for grammaticalized material.

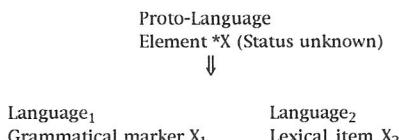
Of similar interest to the evolution of surface case is its loss. One way in which case affixes can be lost is through non-related phonological processes. Wurzel's theory of morphological change is predicated on this type of loss (e.g., Wurzel 1985, 1989). However, this "Natural Morphology" view of language change is only one part of the process by which a language is transformed over time. Werner (1987) argues cogently that morphological change occurs between the poles of diversification and unification. Diversification is the more common situation. Under Werner's model, individual morphological categories or even markers tend to become more isolated (i.e. maximally iconic) the less common they are, whereas they become more condensed (maximally packed with information) the more common they are (Werner 1987:599):

isolation/separation	\Leftarrow Polarities \Rightarrow	fusion/condensation
high regularity/simple rules		complicated
rules/irregularity		
low token-frequency		high token-frequency
high type-frequency		low type-frequency

The aim of morphological change is "a good mixture," i.e. diversification of types. The much rarer situation is for a language to show a preference for unification of its morphological processes (1987:603).

As has been emphasized throughout this study, any discovery of patterns of probability, even if weak, should be factored into the equation leading to a reconstruction. Because it is precisely the grammatical function elements which are reconstructible for Proto-Indo-European, the question of their ultimate origin can reasonably be posed, and their developments in the daughter languages checked against the patterns of grammaticalization which prevail for attested language development.

If the universal patterns of grammaticalization can be discerned, then the reconstructed series of proto-linguistic developments should presumably follow these patterns. In an almost trivial example:



If L_1 and L_2 have formally cognate material as a grammatical marker vs. a lexical item and there is a universal pattern of grammaticalization

Lexical item of type X → Grammatical marker of type X

Then one should reconstruct the proto-language with a lexical item *X, not with the grammatical marker. Likewise, if a lexical item exists as cognates in two languages with purely lexical vs. grammatical functionality, and there is a relevant universal of grammaticalization of such lexical items to become grammatical function words, then the reconstruction is clear. For example, local prepositions often develop from terms for body parts. Cf. the relationship of Greek *ἀντί* vs. Old High German *antluzzi* 'face' and Hittite *hant-* 'forehead', or Swahili *mbele* 'breast' → 'in front of' (Chapter 2, §4.0).

This method is useful for a language such as Proto-Indo-European for which precisely the inventory of morphological categories is disputed. If, as is sometimes claimed (cf. §6.0), Anatolian and Germanic reflect an archaic stage of Proto-Indo-European, then the developments leading to Indo-Iranian, for example, are completed patterns of grammaticalization and their origin might be explained with reference to universals. For example, highly grammaticalized case morphemes should be more bound to the stem and not be formally close to a lexical item. Certainly, this comes close to glottogonic speculation, but it is *guided* speculation.

4.0 Markedness of Categories

Croft (1990:122) summarizes the major grammatical hierarchies found in the world's languages as:

number, grammatical relations, animacy, definiteness, modifiers.

Number is ranked in the markedness relationship:

trial/paucal ⊂ dual ⊂ plural ⊂ singular.²

The grammatical relations hierarchy is:

oblique ⊂ object ⊂ subject.

The animacy hierarchy takes the following form:

inanimate common noun ⊂ nonhuman animate common noun ⊂ human common noun ⊂ proper names ⊂ third-person pronouns ⊂ first/second-person pronouns

²In this example, a language will not have a trial unless it has dual, plural, and singular. A language will not have a dual unless it has a plural and a singular. A language will not have a plural without having a singular. A language can have only singular (i.e. unmarked) forms in all contexts. Tocharian, however, has a singular, dual, paral, and plural. The dual is used for pairs of things in incidental relationship to one another; the paral refers to things which are normally found in pairs.

As Croft points out, the animacy hierarchy is a scale from most animate to least animate rather than a hierarchy of specific features (1990:113; cf. Garrett 1990:262). The animacy hierarchy is important in case marking systems (cf. my Chapter 6, §3.1). The definiteness hierarchy is:

nonreferential indefinite \supset referential indefinite \supset definite.

The modifier hierarchy seems confined to the Austronesian languages but Croft feels that further investigation may lead to its recognition as a cross-linguistic universal (1990:119). The modifier hierarchy in the Austronesian languages is:

relative clauses \supset adjectives \supset quantifiers \supset interrogatives \supset deictics \supset articles

The main manifestation of this hierarchy in the Austronesian languages is in determining when a linker morpheme (or ligature) is required to link modifiers to a head noun.

The reconstruction of markings for number and case and the inventories of pronouns *inter alia* should be checked against the above hierarchies. Further, investigation is needed to see whether some of these hierarchies might not be expandable. For example, the grammatical relations hierarchy only includes the ranking of components for a maximum of three case types: subject, object, all others. The pattern of other case types might also be analyzable in terms of hierarchies of implication and inserted into the grammatical relations series (cf. Chapter 6, §2.0).

If a less marked category is missing in a reconstruction, it can be restored, even if not in substance. For example, if one assumes that the dative is less marked than the ablative and reconstructs an ablative, then the presence of a dative must also be assumed. If, as in the dative plural³, no single form is reconstructible, then both possibilities should be given with an accompanying discussion.

The example of the Austronesian languages' modifier hierarchy raises the problem of universals within one language group. If some feature is universal within a language group in such a way as to reveal hierarchical implicational structures, can one speak of universals in the same way as with pan-linguistically verifiable universals? In such an event, one could speak of, e.g., case systems within the Indo-European languages as implicational structures without extensive reference to other language groups. Presumably, the discovery of universals which are linked to one family of languages will have some motivation if they are true universals and not areal or coincidental phenomena.

³I.e. Germanic/Slavic dative plural *-m- vs. Italic etc. *-bh-. Variation within a pattern (e.g., relative pronouns, demonstratives) may indicate the category is recent. However, if a category is typologically expected, even the variation of daughter forms does not allow its elimination in the parent language.

5.0 Linearity of Morphological Marking

Insofar as linearity belongs to the supralexical domain, it is probably irrecoverable by comparative reconstruction, although Friedrich and Lehmann (both 1974) have attempted to recover this very aspect of Indo-European. They assume the basic harmonizing nature of linear, syntactic universals. Thus, assuming a standard SOV (Lehmann) or SVO (Friedrich) order in Proto-Indo-European, they explain the further developments in the daughter languages as a shift from one type to another. However, neither sets up a sufficiently rigorous means of reconstructing this basic parameter of word order in the proto-language and thus have only given two sets of hypothetical developments without criteria for the selection of one over the other (cf. Winter 1984).

In those instances where linearity of constituents is morphological, there is greater hope to apply knowledge of markedness hierarchies and implicational universals. As will be seen in Chapter 7, §3.1, there are a number of universal ordering patterns in verbal morphology. Under Anderson's (1992) understanding of morphology, this would imply some universal patterns of word formation rule ordering.

6.0 Recent Views on Indo-European Morphology

Two main models of development have been proposed for the morphology of Indo-European (cf. Adrados 1992; my Chapter 7, §6.0). The first, often called Brugmannian and supported by Eichner (1975) *inter alia*, reflects the structure of Sanskrit and Greek very heavily in the reconstruction of Proto-Indo-European; the other, advocated by Adrados, Meid, Neu *inter alia* suggests that Hittite more closely preserves a simpler Proto-Indo-European system whereas Hellenic and Indo-Aryan are late developments which came about because of areal proximity after the splitting off of Anatolian. Polomé (1964) has extended the model to have Germanic split off early analogously to Anatolian. Sturtevant and others in the first half of the 20th century tried to explain the aberrant behavior of Anatolian compared to the traditional reconstruction of Indo-European by suggesting a very early split of Anatolian from Proto-Indo-European before the formation of numerous grammatical categories. Pre-Proto-Indo-European was called Indo-Hittite. Although the name fell into disfavor, the idea is still very much alive in Adrados/Meid/Neu etc. Although they call the earlier stage of the proto-language, e.g., Stage I Indo-European, the name implies the same thing as Indo-Hittite (cf. Cowgill in his papers on the Hittite verbal system 1974, 1979). Schmidt (1992) discusses in detail the implications of newer data on Indo-European which have brought about the proposals of these stages.

7.0 Conclusion

Under the view taken in this study, morphology is a separate component of the grammar. In contrast to the purely linguistic ordering principles of syntax, morphological patterns are constrained enough and linked closely enough both

to formal material (i.e. to idiosyncrasies of a language) and to semantics that their reconstruction is possible. As for any area of linguistic output which occurs in a constrained way, the method of typology can be used in achieving an understanding of the kinds of morphological patterns which are possible in natural languages and thus for a proto-language. The areas which will be looked at in Chapters 6 and 7 are:

- 1.) Grammaticalization/morphologization patterns in diachrony and their reflections in synchrony
- 2.) Patterns of markedness in inflectional material
- 3.) Ordering principles of inflectional material
- 4.) Universality in the formal expression of inflectional categories.

In the following two chapters I will consider verbal and nominal morphology in reconstruction using typological parameters, but separately. However, the goals of investigation are similar.

Chapter 6

Indo-European Nominal Morphology

"How hard his lot! how blind his fate!
What shall he do to mend his state?
Thus did poor Syntax ruminate."

William Combe, *The Tour of Doctor Syntax in Search of the Picturesque*, Canto I

1.0 Introduction

Typological findings can be applied to case systems and the reconstruction of Indo-European case *inter alia* in the following areas:

- 1.) patterns of grammaticalization and loss
- 2.) individual cases and their semantics in terms of markedness theory
- 3.) the overall classification of the Indo-European case system.

The traditional reconstruction of the Indo-European case inventory is based on the attested system of, e.g., Indo-Iranian with 8 cases: nominative, genitive, dative, accusative, instrumental, ablative, locative, and vocative. The analysis of nouns into separate components (i.e. root, theme, ending) has progressed to more or less glottogonic speculation about the origin of the endings as well as a tentative age ranking of the different types of nominal declension.

It will be shown in this chapter that universals of grammaticalization can give some insights into the development and age of surface case. Typology of case inventories can be used in evaluating a reconstructed Indo-European with an active-stative or ergative structure.

2.0 Grammaticalization and Hierarchy of Case Marking

As noted in Chapter 5, §3.0, one way that case morphemes may arise is through the grammaticalization of adpositions. Heine *et al.* (1991:167) also state this process of grammaticalization as:

lexical → (adverbs) adpositions → case affixes → zero

This kind of development has two implications for the historical analysis of case morphemes. The more recent a case, the more likely it is to have a coexisting lexical form as an independent element, whether as an adposition¹ or in some

¹According to Heine *et al.* (1991:128 ff.) spatial adpositions (which can be a source for case morphemes) commonly have their origin in words for body parts or landmarks. They set up the hierarchy:

under → on, in → front → back

and continue by noting that if any of these spatial concepts are from a body part model, then none farther rightwards may come from a landmark model. This universal applied for 124 out

other function. Conversely, the more opaque a case morpheme is, the more likely it is to be older. Of course, this does not exclude other chains of development, for example, case morphemes from particles in agglutinative systems (Brigitte Bauer 1992, p.c.).

Heine *et al.* (1991:167) give the following hierarchy of case functions:

Instrumental	Locative	Dative	Accusative	Nominative
(Comitative			Ergative	Absolutive
Directional)			Genitive	

The leftward cases are more "concrete," the rightward more "grammatical." In other words, the concrete cases are more firmly founded in semantics, the grammatical more in word formation rules (cf. Kuryłowicz 1964a:178). The ablative is also a concrete case. Heine *et al.* (1991) note that this hierarchy is in precise agreement with the stages of grammaticalization and that they run parallel. Thus, the nominative is more likely to be zero than the instrumental. However, the question is not touched upon how strong the implicational hierarchy is. For example, if there are no accusative & nominative, does this imply that there can be no dative?

2.1 Indo-European Dative Plural

When reconstructing case, the formal identity of case morphemes and functions are the first priority in positing a proto-form. For example, there is considerable agreement in different Indo-European languages on a nominative singular *-s marker in many masculine nouns. For example:

Skt. *asva+ḥ* Gk. *τινο+s* Go. *gast+s* Hitt. *antuhsa+s*

All of these forms are in formal opposition to other case endings, all signify the nominative singular, and all are regularly relatable in their phonology. Therefore, one must assume a proto-form *-s with the function of nominative singular animate. The widespread agreement among the Indo-European languages on this particular case form and function make it almost certainly Proto-Indo-European. Let us now compare this instance with the dative plural which has already been alluded to several times before:

Skt. *deve+bhyah* Lith. *vilka+ms* Go. *wulfa+m*

Szemerényi (1990:169) gives for the reconstruction of the dative plural two possibilities: *-bh(y)os or *-mos. The lack of agreement which is consistent across several languages may point to shared innovation or conservation on the

of 125 languages they studied (the exception being Newole). Such diachronic universals may help in evaluating glottogonic claims about proto-languages.

part of one respective language group. Conversely, it may represent innovation in all the languages. If the latter is true, then one may suppose that the proto-language did not have the case in question. The function of the dative may have been combined with that of some other case or not present at all in case morphology. Hamp's (1991) and Markey's (1979) attempts to relate the two different case markers to deictics and to the ancestral lexemes of German *mit* and *bei* fulfill the second of the considerations stated above, namely, that the recent case functions are more likely to have formal relatives in the lexicon. If this etymology is valid, then, using the criteria of grammaticalization, the Indo-European nominative singular is likely to be older than the dative plural. However, the diachronic universals in question are of uncertain statistical strength and the chance that coincidence may play a role not inconsiderable.

2.2 Case Syncretism in Greek & Germanic

In the development of Greek from a traditional 8 case Indo-European, several cases were subject to syncretism (Rix 1991:116):

$$\begin{array}{ccc} \text{Genitive} & & \\ & \rightarrow & \text{Genitive} \\ \text{Ablative} & & \end{array}$$

$$\begin{array}{ccc} \text{Dative} & & \\ \text{Instrumental} & \rightarrow & \text{Dative} \\ \text{Locative} & & \end{array}$$

The genitive is relatively more grammatical than the ablative and it is the genitive function which survived. Likewise, the dative is the most grammatical of the three cases which syncretized and it is the dative function which survived.

In Germanic, the Indo-European cases were preserved in the singular except (Krause 1968:139; Bammesberger 1990:38ff.):

$$\begin{array}{ccc} \text{Dative} & & \\ & \rightarrow & \text{Dative (old dative may have been lost altogether)} \\ \text{Locative} & & \end{array}$$

$$\begin{array}{ccc} \text{Ablative} & \rightarrow & \text{adverbial fossils} \end{array}$$

Again, the dative as the most grammatical case survived the syncretism with the locative; or the loss of the dative helped bring about a reinterpretation of the locative as dative in function. The ablative is a concrete case and was lost early on. Although traces of the highly concrete instrumental survive in, e.g., Old High German, it was moribund.

From the above examples, one might predict two diachronic universals. First, the more concrete a case is, the more likely it is to be lost. Second, if two cases fall together, it is the more grammatical function which will survive.

In 8 case Indo-European, a number of endings were identical for different case functions:

- Genitive - Ablative sg. (except *o*-stems)
- Nominative-Accusative-Vocative dual
- Dative-Ablative-Instrumental dual
- Nominative-Vocative pl.
- Dative-Ablative pl.
- Nominative-Accusative-Vocative neuters

For the singular, only two quite different cases (genitive: more grammatical vs. ablative: more concrete) are identical. In the dual, two grammatical cases (nominative & accusative)² are identical as are three relatively concrete cases (dative, ablative, instrumental). For the plural, two concrete cases (dative & ablative) are identical. The singular as the least marked category shows the most diversity of form whereas the dual as the most marked has the greatest uniformity. This is in accordance with the view on the diversity of morphological types discussed by Werner (1987; my Chapter 5, §3.0). Interesting is the fact that the high frequency cases (i.e. in singular) are identical for two cases with a differing degree of grammaticality/concreteness whereas in the lower frequency cases (e.g., dual), the identical forms are for similar case types. This would also seem to confirm Werner's generalizations about the relative complexity or rule systems as well as the relevance of the case hierarchy.

These above examples give support to the strength of this case hierarchy and a control of as well as a motivation for reconstructions of diachronic developments of case inventories. For example, according to Kurylowicz (1964a:195), the Indo-European dative *-ei is derived from the dative-locative *-i. He then reconstructs a prior stage with a locative *-(e)i. If this is so, then the universals above would suggest that there was some other form which was dative (cf. also p. 199 his reconstruction of the very earliest case system).

Investigation into the statistical strength of these developmental universals remains to be carried out, however. Also of importance will be a statistical study of the disturbance of case hierarchies by, e.g., phonological change to see to what extent this may trigger further loss of case marking. If the hierarchy is strongly cohesive, then the loss of an intermediate category might make the impending loss of all more marked categories predictable (cf. Chapter 5, §3.0).³

²I will ignore the vocative whose status as a case is not comparable to the others.

³Here, the development of inflectional languages to a less inflectional type could be of interest in those instances where the presence of an inflectional form as a literary standard may motivate the reinsertion of lost categories (e.g., Middle Indic).

3.0 Some Universal Categories

If a language uses word formation rules to interpret matter from a syntactic structure, certain properties which can be expressed by morphology are:

- Subject of transitive verb
- Object of transitive verb
- Subject of intransitive verb

These relations may also be labeled as respectively:

- A (= Agent)
- O (also called P = Patient)
- S

Nichols gives the following classification of language types based on the formal differentiation in marking these roles (1992:65-67):

Neutral:

$$A = O = S$$

Accusative:

$$S = A; O \text{ distinct}$$

Ergative:

$$S = O, A \text{ distinct. Tense or person based ergative/accusative split}$$

Three-way:

$$A, O, \text{ and } S \text{ all distinct}$$

Stative-Active:

$S_1 = A, S_2 = O$; two different kinds of intransitive verbs: stative vs. actives. Can have accusative or ergative slant, i.e. languages are stative-active with an accusative or ergative base.

Hierarchical:

Inflectional S or O based on person, number and/or animacy

Whether such a typology is sufficient to classify an entire language or only a part of the grammatical system is a question we will not look into here. Nichols further notes (1992:68-69):

"The ordering of neutral > accusative > ergative > three-way > stative-active > hierarchical gives a cline of decreasing relevance of nominal syntactic relations, or increasing relevance of nominal semantics and semantic relations, to morphological marking: the neutral type makes no distinctions, the accusative type represents a grammaticalization of subject-object relations, the ergative type grammaticalizes agent and patient, the stative active type grammaticalizes the lexical categorization of the verb, and the hierarchical type

grammaticalizes not the functions of the individual arguments but their ranking in referential semantics relative to each other."

Ergative alignment favors dependent marking morphology (i.e. case); stative/active & hierarchical favor head marking morphology (i.e. verbal marking; 1992:101). Particularly the accusative, stative-active, and ergative types of language have received much attention in typological and Indo-Europeanist literature. For example, Knobloch (1985) defines three types of verbal attitude (*Verbalauffassung*) which are reflected in the case systems of languages:

- 1.) States
- 2.) Processes
- 3.) Actions

He classifies languages into three corresponding types according to the dominance of a verbal attitude:

- 1.) Verbal contents are seen as static/conditional (active-stative language)
- 2.) States are opposed to processes (ergative language)
- 3.) All verbal statements have a subject which derives historically from ergative or absolute (nominative-accusative language)

Klimov (1979) has claimed that there is a universal evolutionary pattern of case systems:

active/stative → ergative/absolute → nominative/accusative + oblique.

This corresponds to chronological stages which have been proposed for the development of Indo-European nominal morphology (cf. Klimov 1985, 1991; Luraghi 1987:364-365; Lehmann 1989; Schmidt 1979, 1980, 1983, 1992). However, Nichols (1992:256) shows that this evolutionary pattern is not probable. In the following two sections some of the implications of reconstructing Indo-European as an ergative or active language will be contrasted. This means using more holistic models of language types than have been invoked in this study till now. One might go about this by setting up implicatures:

- 1.) If a language is Type X, it has structures A, B, and C.

However, this implicature is circular because it is the features A, B, and C which define the type. Better would be the formulation:

- 2.) If a language has A, B, and C, then we will call it Type X.

From this can be derived further implicatures:

3.) If a language is of Type X (i.e. fulfils the conditions of the previous definition), it will have D, E, F, and G in that order of statistical strength and where any of these structures may be understood as a further set of implicatures.

For this formulation to be adequate, the set of defining characteristics should be kept at an minimum whereas the set of implicatures should be as broad as possible and clearly described in terms of their statistical strength. For example, the set of features needed to define ergative languages is twofold: S = O (i.e. absolute case) and S/O is not equal to A (i.e. ergative case). Klimov (1979) has proposed a whole set of features which are found in stative-active languages, but many of them may be erroneous (Nichols 1992; cf. below §3.2). The taxonomy of languages which results from this model will be useful for a reconstruction if the defining patterns and the resulting implicatures can be shown to be statistically strong or even absolutely valid, whatever their range.

3.1 Ergativity

Few languages show pure ergative marking; rather, they generally split an ergative marking system with an accusative system either on the basis of animacy or for different verbal domains.

It is a universal (apparently absolute) that when a language has both ergative and accusative nominal markings, the more animate nouns have accusative marking whereas the less animate nouns have ergative marking (Silverstein 1976; cf. Nichols 1992:91, 95, 160-162). Neutral or three-way marking may occur for nouns between the ergative and accusative areas on the animacy hierarchy. As given in Croft (1990:116; cf. also Garrett 1990:262), the animacy hierarchy is:

+tu		most animate
-tu		
+ego	↑	
-ego		
+pronominal		
-pronominal		
+human		
-human	↓	
+animate		
-animate		least animate

Split ergativity on the basis of animacy is pragmatically motivated. The agents of transitive verbs are most likely to be highly animate. Because the expectation that the transitive subject (A) will be animate is high, animate subjects are less likely to need some special subject marking. On the other hand, highly inanimate nouns are less common as the subjects of transitive verbs so that languages are more likely to mark an inanimate A with the ergative case. In terms of accusativity, the

situation is directly reversed. Accusatives are more likely to be inanimate objects of transitive verbs (O) so that an inanimate O is less likely to need special accusative marking than a highly animate one.

In contrast to this synchronically motivated pattern of split ergativity we find a diachronically motivated split in the verbal domain which is a direct result of grammaticalization. Anderson (1977; 1992) offers an interesting discussion on the means by which ergative systems may come about. Ergatives are common in sentences with perfect tenses or past tenses which can develop from the perfect.

Passive constructions are semantically close to perfects, in that they generally present a state resulting from a completed action. When a language loses (as a consequence of other changes, either phonological or of usage) an inflected perfect, it is plausible to suggest that the scope of the original passive may expand to fill the gap. Where this becomes the main function of the (original) passive, furthermore, the fact of the loss of the simple active perfect will lead to a kind of opacity which has as its consequence the reanalysis of the construction. The result of this is that the morphology which originally marked the operation of a passive transformation comes to be the marker rather of perfective aspect. (Anderson 1977:336; cf. also 1992:353ff.).

One may set up diachronic universals:

- 1.) passive → perfect/past
- 2.) possessive → perfect/past
- 3.) nominative + passive → ergative + perfect

Anderson gives an example of the similarity of perfect/passive and ergative constructions (1992:357):

They were accosted by him on the way to the underground.

O A

Notional object (O) has same marking as intransitive subject (S), i.e. O = S.

Verb agrees with notional object and not subject, i.e. were, not was.

Notional subject (A) appears with special marking (*by* + oblique), different from S.

If the semantics of a perfect/passive become opaque, it can be reinterpreted as an ergative. In this way, ergative marking can be split so that it is only in, e.g., a clause whose main verb is marked for perfect aspect (or from a tense form which formally is descended from a perfect). This is not because of an affinity of perfect and ergativity, rather, the way distinctions may be formed between perfects and non-perfects involve the generalization of constructions "whose formal properties are 'ergative' in a new perfect, or 'accusative' in an innovated imperfect." (Anderson 1992:355). As original verbal perfect forms disappear, their sense is supplied by passives which may then lead to the decline of association

with the active and a reinterpretation as an ergative with perfective/past tense. Hindi does this and now has a required ergative in past tense clauses (1992:356). Possessive constructions may also lead to new perfects and eventually to ergativity (1992:357). Hence, one may expect formal correspondences between possessive and ergative markers. To summarize features or subfeatures which are possibly implied by an ergative alignment:

- 1.) Definitional: A vs. S-O
- 2.) Split application by animacy
- 3.) Split application by tense
 - a.) Diachronic relationships of tense/aspect/voice markers.
 - b.) Diachronic relationships of possessive/ergative markers.
- 4.) Antipassive constructions
- 5.) Ergative alignment and dependent marking, e.g., case (cf. Chapter 2, §3.0)
- 6.) Ergative alignment and high complexity (possible universal).

No. 1 as a definitional feature is of absolute universality for any ergative language. If this opposition can be reconstructed by comparative or internal means, then the other features *must* be considered as well. No. 2 is a very strong universal; however, finding traces of split ergativity may be difficult so that only its presence but not its articulation can be reconstructed. No. 3 by itself is not a strong enough universal to be reconstructible merely because of No. 1 or 2's reconstruction. However, the presence of subfeatures a or b make No. 3 reasonable, if the strength of the diachronic generalization can be determined and especially if Nos. 1 and 2 have already been posited. Feature 4 has been shown by Nichols (1992:157) to be a fairly common feature also of accusative languages so it must be disregarded here unless it is demonstrated to be diachronically derivable from one or the other language type. No. 5 is a strong universal but No. 6 only a possible.

3.1.1 Indo-European as an Ergative Language⁴

At the beginning of this century, Uhlenbeck (1901) wrote an article of Hampian brevity in which he noted the similarity of the case behavior and forms of thematic neuter nouns in nominative and accusative to the thematic feminine/masculine accusative forms:

	m/f	n
Nom.	-s	-m
Acc.	-m	-m

the pattern of suppletion of pronominal stems:

⁴It is interesting that in two recent introductions to Indo-European linguistics, the ergative theory is either reported as a given (Beekes 1990:233-234) or is barely mentioned except in cryptic footnotes (Szemerényi 1990:362-363).

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	1st sg. Demonstratives (m/f)		Demonstratives (n)
Nom.	* <i>eg-</i>	* <i>so</i>	* <i>to-</i>
Acc.	* <i>m-</i>	* <i>to-</i>	* <i>to-</i>

and the presence of two different types of verb inflection (present vs. perfect systems; cf. Rumsey's survey, 1987:21). He proposed essentially that *-s was an ergative marker, *-m the absolute.

Let us relate the proposal of Indo-European ergativity to the structural universals given in §3.0.

1.) Definitional: A vs. S=O

This pattern is not extant as a functioning residue in the daughter languages. If Indo-European is reconstructed with neuter N/A endings as *-Ø or *-m, vs. m/f *-s and *-m, this fits a pattern:

m/f	S =	-s	A =	-s	O =	-m
n	S =	-m /-Ø	A =	-m/-Ø	O =	-m/-Ø

that is to say:

m/f	S = A, distinct from O
n	S = A = O

which is an accusative pattern for the animates and a neutral one for the inanimates. Support for an ergative construction in the inanimates (which is where it is universally most likely) will only come if it can be demonstrated that for the neuters A was originally distinct. This is not possible. That the pattern reconstructed above is plausible and stable is shown by the fact that it has survived with only small differences in almost all Indo-European languages⁵ which still have gender and case marking, e.g.:

S der Mann	A der Mann	O den Mann
S das Kind	A das Kind	O das Kind

in German where S = A distinct from O for the masculine but in the neuters S = A = O. The extreme persistence of this pattern despite a radical change in how it is marked makes its reconstruction for Indo-European on the basis of a similarity of endings *-m and *-m in the m/f accusative sg. and neuter nominative/accusative unacceptable. The split of accusative marking vs. neutral marking also agrees with a non-definitional universal about the distribution of such markings on the

⁵Czech has a distinct accusative neuter form in its pronominal system.

animacy hierarchy (cf. No. 2, above). Diachronically, such a nominative/accusative-neutral pattern is clearly motivated:

	Nominative	Accusative
I.	neuter (-s)	-m
	animate -s	-m
	↓	
II.	neuter (?)	-m
	animate -s	-m
	↓	
III	neuter -m	-m
	m/f -s	-m

Under this reconstruction, Stage I is purely nominative/accusative; however, for neuter nouns the nominative is pragmatically uncommon.⁶ If this neuter nominative ending is rare, then a Stage II might be expected wherein the ending is indeterminate,⁷ leading to a final Stage III where the accusative (most common ending) takes over the slot of the former neuter nominative. The interpretation of demonstrative pronouns parallels this. The split of stems for the 1st person sg. pronouns is doubtful as evidence for ergativity since this is close to the very top of the scale of animacy and universally unlikely to have ergative marking. As extremely frequent, they are more likely to be maximally iconic than less common forms.

3.) Split application by tense

- a.) Diachronic relationships of tense/aspect/voice markers.
- b.) Diachronic relationships of possessive/ergative markers.

For No. 3a, one looks for a development of perfect or past from a passive or middle. This is in fact a possible interpretation for the distribution of present and perfect system in Indo-European. Further, there is no reconstructible morphological passive, suggesting this may have been reinterpreted. For No. 3b., a formal similarity between possessive and ergative markers is needed. Again, if the nominative sg. m/f *-s is interpreted as ergative, then Indo-European might have such a similarity in genitive sg. *-es or *-s-yo (Knobloch 1985:194).

4.) Antipassive constructions

⁶This might be one of the ways a formal neuter gender arises.

⁷Similar in principle is the question of the correct genitive singular of German personal names ending in [s]. Interviews I have conducted with a number of native speakers have shown variation and uncertainty as to the correct genitive sg. of, e.g., *Fritz* with frequent attempts being made to avoid the form paraphrastically (*von Fritz*) or derivationally (*das Fritz'sche*). Rather than set up a pattern of alternations, it seems more likely that there is no single correct form. The speaker uses his competence to produce a form according to available prototypes in an *ad hoc* manner.

Spencer (1991:24) describes the antipassive as:

Abs.	+ intransitive verb (=S)	+ Oblique (O)
------	-----------------------------	------------------

Schmalstieg (1987) has proposed a development of Indo-European case patterns from older antipassives:

I. Ø-absolute	s-ergative	m-dative/locative object ⁸
	↓	
II. nominative	nominative	accusative

According to Schmalstieg, the Ø-absolute became nominative because of use as S with intransitive verbs in antipassive constructions. The s-ergative became nominative because it was the same formally as the s-genitive used as A in the past tense with intransitive verbs in antipassives. In such an instance, the S-function is transferred and the old Ø-absolutive is supplemented in its role as O with added -m. Nouns ending in *-ā and *-ter keep the Ø-nominative because of their already high degree of agentivity. Highly animate nouns may also add *-s very late (Schmalstieg 1987:352 on Hittite proper names with the fluctuation N.sg. -Ø vs. -s). The middle voice derives from old intransitives and is the same as the *-tó participle in antipassives' perfect. Although the presence of an antipassive cannot be used to prove Indo-European was ergative (cf. Nichols 1992:157), the assumption of such a construction can explain developments from an ergative Indo-European proved by other means.

- 5.) Ergative alignment and dependent marking, e.g., case.
- 6.) Ergative alignment and high complexity (possible universal).

Unless one indulges in glottogonic reconstruction, Proto-Indo-European may be reconstructed with a complex morphology and an extensive case system. However neither of these universals is reversible and the occurrence of dependent marking or high complexity does not require the reconstruction of ergativity. They are only useful for contrasting competing reconstructions wherein another alignment is proposed which would violate them.

To summarize, the ergative hypothesis is not strongly supported by the formal or typological evidence. The Indo-European patterns which are compatible with an ergative stage are for the most part not limited to ergative language. The strongest evidence for an ergative lies in the diachronic interpretation of the verbal system and in the formal similarities of nominatives and genitives. An ergative reconstruction does not have to violate universals.

⁸This object is the direct object of an antipassive

3.2 Active-Stative Languages

Some of the characteristics which Klimov claims for active/stative languages are (1977; cf. Nichols 1992:9-10 for a complete listing):

- 1.) Nouns are classified on the basis of +/-animate activity.
- 2.) Verbs are differentiated grammatically as active/inactive or active/stative according to their semantics and not transitive/intransitive according to syntax; active/inactive is older than and ancestral to transitive/intransitive.
- 3.) Affective verbs and verbs of experience are prominent.
- 4.) Nominal inflection and nominal number differentiation are rudimentary.
- 5.) Active languages are SOV with indirect objects inserted between S and O.
- 6.) Active languages are polysynthetic, syntactic relations are incorporated into the verbal form.
- 7.) Possessives are in complementary distribution according to alienable vs. inalienable association.

However, Nichols (1992) has done an extensive survey of languages for these features and discovered that several of these generalizations came because these features cooccur for geographical reasons in the New World and Pacific regions. She summarizes the actual correlation of stative-active classification to other characteristics (1992:255):

1.) Gender or noun classification	no
2.) Stative/active opposition	yes, by definition
4.) Number absent or weak	no
4.) Head marking	yes
5.) SOV order	no
6.) Valence	no
6.) No PP's	no
7.) Inalienable possession	yes, incidentally
Inclusive/exclusive	no

Apart from No. 2 which is definitional, only head marking and inalienable possession are implied by stative-active alignment. Geography and head/dependent marking types are more directly correlated with many of these characteristics than stative-active alignment and in varying degrees of genetic and areal stability (Nichols 1992:116, 160, 181):

Strength of factors in stability:

Gender:

high genetic, moderate areal, contingent on frequency & geography

Noun classes:

high genetic, moderate areal, contingent on frequency & geography

Plural neutralization:

neither genetic nor areal, contingent on frequency & geography

"Results could be due to chance"

Case inflection in nouns:

genetic and areal, somewhat more genetic

PP's:

areal

Voice & valence operations:

direction of valence-changing operations somewhat genetically stable

Inalienable possession:

low genetic and moderate areal, contingent on frequency & geography

Inclusive/exclusive pronouns: geography

high genetic, moderate areal, contingent on frequency & geography,

higher frequency = low stability

Active languages tend to lack case but then they are "almost all radically head-marking" a more general claim (1992:159).

3.2.1 Indo-European as Active

Some features of Proto-Indo-European which are used to support its interpretation as an active-stative language include (Lehmann 1989; numbering as above, §3.2):

- 1.) Active & inactive nouns and verbs (cf. Chapter 1, §5.0). m = inactive, h = collective, Ø = deictic.
- 2.) Central importance given to lexical as opposed to grammatical meaning.
- 3.) Affective verbs with special structures. No word for 'have'
- 4.) Plural forms are late. Only two cases: active (i.e. nominative of Meillet) and inactive (i.e. accusative of Meillet). Active languages have no genitive; IE genitive and nominative sg. consonant stems are similar. Other cases are recent, cf. *-phi*. "...the declensional system of the early dialects was based on selection of earlier postposed particles and conflation of them with roots." (1989:126).
- 6.) No passive, perfect is defective.

Of these features, Nos. 1, 4, and 6 turn out *not* to be derivable from active-stative alignment. Nos. 2 and 3 are both part of the definition of active-stative languages and make up its "conceptual cast." This demonstrates the hazard of working with a typology whose motivation by areal or genetic factors is not fully worked out. Most of the non-semantic or non-lexical features which have been proposed for stative-active languages seem to be motivated by other structures than alignment. Nichols (1992:272) realizes these difficulties for Indo-European as an active-stative language but considers the lexical and semantic information used by Gamkrelidze & Ivanov (1984) to be "strongly suggestive of the active conceptual cast as Klimov defines it." However, she doesn't study this conceptual cast (1992:256); the strength of generalizations about conceptual cast will have to be determined before they may be definitively used in evaluating or modifying the reconstruction. Because the alignment of a language is diachronically relatively stable (1992:167), evidence for stative-active distinctions must be all the stronger. Most importantly, a putative active-stative alignment for Indo-European cannot be used to explain or give preference to reconstructions of Nos. 1, 4, or 6, nor can their reconstruction by other means be used to strengthen Nos. 2 or 3.

4.0 Conclusion

In the study of proto-linguistic nominal morphology, fundamental questions on the structure and status of morphological markers need further research. For example, until the nature of case and its semantics are better comprehended, many questions about the system in Proto-Indo-European will have to remain unanswered. This research will have to determine:

- 1.) Whether the prototype analysis of semantics is adequate for describing morphology.
- 2.) To what extent implicational patterns of case structure are indeed a function of semantics and not of general syntax (i.e. is there a significant difference between *meines Freundes* and *von meinem Freund* aside from stylistics and pragmatics?).⁹
- 3.) What the statistical strength of generalizations about the above are and especially for patterns of diachronic development.

A further need will continue to be the investigation of the actual language data of the daughters in relation to new views on the proto-language. If, for example, one denies for Proto-Indo-European a three gender system, then the Anatolian material must be examined without prejudice for its retention or loss of any traces of a third gender.

Assuming that the above research needs can be accomplished, then the historical linguist will be able to apply the basic rules of reconstruction using typological methods to the reconstruction of Indo-European nominal inflection and its category system. The study of case patterns in ergative, accusative, and active languages offers valuable insights into patterns of semantics and syntax which leave very specific traces in the formal structures of a language.

⁹In the stylistics of Modern German, the genitive case is rapidly becoming a written form only except for restricted usages which resemble those of Modern English. The competition of two forms is a sign of change in progress. Here the question is: does the expression of a thematic role using word formation rules vs. syntactic rules have an effect on the implicational hierarchy of case marking as a whole?

Chapter 7

Indo-European Verbal Morphology

I had noticed, in other foreign languages, that verbs are bred in families, and that the members of each family have certain features or resemblances that are common to that family and distinguish it from the other families - the other kin, the cousins and what not. I had noticed that this family-mark is not usually the nose or the hair, so to speak, but the tail - the Termination - and that these tails are quite definitely differentiated; insomuch that an expert can tell a Pluperfect from a Subjunctive by its tail as easily and as certainly as a cowboy can tell a cow from a horse by the like process, the result of observation and culture. I should explain that I am speaking of legitimate verbs, those verbs which in the slang of the grammar are called Regular. There are others - I am not meaning to conceal this; others called Irregulars, born out of wedlock, of unknown and uninteresting parentage, and naturally destitute of family resemblances, as regards all features, tails included. But of these pathetic outcasts I have nothing to say. I do not approve of them, I do not encourage them; I am prudishly delicate and sensitive, and I do not allow them to be used in my presence.

Mark Twain. *Italian with Grammar.*

Het werkwoord is veel gecompliceerder dan het substantief. Ook de reconstructie is veel lastiger, omdat de werkwoordssystemen van de verschillende talen sterk verschillen.

Beeke (1990:268)

1.0 Introduction

The reconstruction of the Indo-European verbal system has remained a hotbed of dispute for researchers over the entire century and is vital for understanding the relationship of the Indo-European languages and through them the peoples who spoke them. The primary concern here is the method and the huge amount of literature has barely been touched on.¹ As with nominal morphology, one can examine patterns of grammaticalization and loss, synchronic inventories, and holistic classifications of the verbal system or parts of it.

2.0 Indo-European Verbal Systems and Ausgliederung

Before Anatolian was recognized to be an Indo-European language, a complex system was reconstructed which resembled for the most part the following Indo-Aryan pattern (Szemerényi 1990:244):²

Voice: 3 - active, medium, passive

Mood: 5 - indicative, subjunctive, optative, imperative, injunctive

¹Shields 1992 appeared too late to be taken into account.

²Note that Szemerényi combines tense and aspect under the term *tempora*, in part an indication of the relatedness of these categories.

Tempora: 7 - present, imperfect, aorist, perfect, past perfect, future, conditional

or Greek:

Voice: 3 - active, medium, passive (in aorist and future)

Mood: 4 - indicative, subjunctive, optative, imperative

Tempora: 7 - present, imperfect, future, aorist, perfect, past perfect, future perfect

Most other dialects was assumed to have experienced major loss of verbal morphology in their prehistory. For example, Gothic has:

Voice: 2 - active and middle/passive

Mood: 3 - indicative, imperative, subjunctive

Tempora: 2 - present and preterite

In keeping with the view that language decline involved loss of morphological categories and with the high esteem in which Sanskrit was held, it seemed clear to earlier Indo-Europeanists that the Germanic system must represent a degenerate form of what is so well preserved in Sanskrit (cf. Chapter 1, §5.0). However, Anatolian is extremely old, yet relatively simple:

Voice: 2 - active, medio-passive

Mood: 2 - indicative, imperative

Tempora: 2 - present, preterite

There are a number of ways to account for this (cf. Schlerath 1981:183-184):

1.) Proto-Indo-European and Hittite are distantly related as, e.g., Modern English and Classical Latin; one can determine a relationship, but reconstruction *per se* is not feasible. Such a view is best represented in the classical Indo-Hittite hypothesis. This theory leaves the "Brugmannian" reconstruction intact.

2.) Hittite separated from Proto-Indo-European at an earlier stage than any other language group, yet the degree of relatedness is close enough that one cannot leave Hittite out when doing comparative work. Here one has the sub-conjecture that Hittite is either remarkably archaic and must project the relatively simple verbal system of Hittite onto a reconstruction, or that Hittite has undergone considerable syncretism, perhaps even creolization (but cf. Polomé 1982b), and poorly reflects the original state of Proto-Indo-European. Then, e.g., *hi*-conjugation must be explained as a late development from one of the reconstructed Indo-European categories.

3.) Similar in principle to the early emergence and "decay" of Hittite is the idea that Hittite left the homeland not much earlier or later than other language groups but still lost most of the original verbal distinctions.

4.) Hittite and other Indo-European languages have converged from originally different genetic bases and then reseparated (cf. Schlerath 1981:199, 1982:65). Trying to reconstruct a proto-language may be building structures that never really existed.

Anyone trying to reconstruct a realistic Proto-Indo-European proto-language must therefore state and justify which distribution of functions was earlier or whether the proto-language had some unattested distribution of values which evolved differently in Anatolian and the other languages. The following solutions have been suggested:

- 1.) The Hittite verbal system is oldest.
- 2.) The Greek etc. verbal system is oldest.
- 3.) A different Indo-European verbal system developed into the Greek and Anatolian ones.

The last possibility is particularly interesting in the context of this study because the systems proposed for Indo-European under No. 3 may be unlike the daughter languages and should be compared to and checked with non-Indo-European for their conformance to universals.

After defining the some major verbal categories and universals (§§3.0-3.1), we will evaluate suggested patterns of diachronic development for plausibility and probability and then return briefly to the *Ausgliederung*.

3.0 Verbal Categories

How to define verbal categories satisfactorily and without recourse to a Latinate model has occupied scholars for centuries (cf. Binnick 1991). Anderson (1985:189-198) has differentiated inherent, relational, and agreement categories of the verb. Inherent categories reflect properties whose domain is the inflected word itself (1985:172). Relational categories reflect the position the word takes up in larger structures. He gives as inherent categories:

adverbial, polarity, modality, tense, aspect, mood, active/stative, conjugation class.

Relational categories are:

number + source, causative, voice, reflexive + reciprocal.

Agreement categories include person and number. Not all of these categories are consistently expressed in the inflectional morphology (1985:189-190):

...in most languages, a large part of the complexity of word formation (and inflection in particular) concerns the verb. A complete catalog of the distinctions of meaning that can be indicated formally by verbs in the

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languages of the world (independent of the lexical meanings of stems) would be extraordinarily long and difficult...Perhaps the most important inherent category of verbs which is undeniably inflectional is that of tense and aspect (along with mood)...These categories can be reflected formally in the direct application of grammatical processes of all sorts...

Bybee (1985:28-29) defines the following verbal categories:

valence, voice, aspect, tense, mood, number-agreement, person-agreement, gender-agreement, purposive, and status.

However, in her analysis of verbal morphology she also examines only aspect, tense, and mood (1985:139). She suggests that valence, voice, and agreement involve a wider syntactic context than verbal morphology. Put differently, tense, aspect, and mood are more likely to be expressed using word formation rules than valence, voice, or agreement.

Tense is a deictic function indicating location on a time line (cf. Comrie 1985; Shields 1988). Tense has three parameters:

- 1.) deictic center,
- 2.) position relative to deictic center (i.e. before, during, or after),
- 3.) distance from deictic center.

Languages differ in their tense systems by the degree of accuracy of distinctions, and in the way tense is divided among lexicon, word formation rules, or syntax (Comrie 1985:10). Tense can be expressed accordingly with lexical items, morphology, or lexical composite expressions. Chung & Timberlake (1985:203) describe tense in terms of a directional temporal dimension with a point or interval as tense locus. Tense situates an event in time by relating an event frame to a tense locus. Priority is given to the speech moment as the tense locus, i.e., this is the unmarked instance. For other tense loci one needs an additional word or other marker. Absolute tense occurs in systems where the speech moment equals the tense locus. Another point as a speech locus is relative tense. The relation of the tense locus to the event frame is anterior, posterior, or simultaneous. These relationships are only concerned with frame vs. tense locus. Some languages are metrical in that they measure distance between tense locus and event frame in approximate terms (1985:204). A three way tense system is not the most common. Usually there is either a future vs. non-future or a past vs. a non-past. There is, however, never a present vs. non-present.

Aspects "are different ways of viewing the internal temporal constituency of a situation." (Comrie 1976:3). Aspect characterizes:

...the relationship of a predicate to the time interval over which it occurs. This definition is intended to include two distinct types of relationship. First, change. Predicates describe states, situations, properties, and so on, that can

either remain constant or else change over time. The notion of change is central to aspect. (Chung & Timberlake 1985:213).

The verbal inventories listed in §2.0 include aspectual and tensual categories as "tempora". Before they can be evaluated using the universals in §3.1, the status of these categories will have to be sorted out.

Mood is defined in terms of subjectivity, factuality, epistemic and deontic attitude, possibility, probability, and necessity (Palmer 1986). Epistemic modality reflects opinion whereas deontic modality deals with the necessity or possibility of acts performed by agents (Palmer 1986:18). These two different notions are handled by many languages using the same devices. Mood is a grammatical category of the verb which is not present in all languages. All languages, however, do express modality.

In discussing the verbal morphology of Indo-European, the following labels will be used:

Tense

Absolute tenses:

- present - simultaneous to tense locus, unmarked
- preterite - anterior to tense locus
- future - posterior to tense locus

Relative tenses:³

- perfect - event locus is anterior to tense locus which may be present, preterite or future

Mood:

- indicative - unmarked
- optative - epistemic
- subjunctive - deontic
- imperative - deontic

Aspect:

- imperfective - relationship of change
- perfective - relationship of constancy

3.1 Universals and Markedness Hierarchies

One finds the below implicative markedness patterns for the verb; however, with the exception of tense, these markedness hierarchies are not confined to verbal morphology alone, but extend to the verb phrase or sentence (Croft 1990:93):

Tense: future \supset preterit \supset present

Aspect: perfective \supset imperfective

³Binnick (1992) discusses the origin of this division absolute/relative tense and their relationship to aspectual categories. The model given here is a simplification which, however, satisfies the needs of the following discussion.

Mood: hypothetical (excluding imperative) ⊃ indicative

Voice: passive, mediopassive ⊃ active

Inflectional categories: person-number, gender agreement ⊃ tense-aspect-mood

The definition of universals on the scale from absolute to idiosyncratic has remained relatively untouched.⁴ Dahl shows that central TMA (Tense/Mood/Aspect) categories, i.e. common ones, tend to be more probably marked in the morphology (1985:185):

...out of 155 morphologically expressed categories, 117, i.e. roughly 75 per cent, belong to a group of three, viz. PAST, PFV:IPFV and FUT...

This implies a strong connection between the semantics of TMA and the means of expression.

In discussing the morphological marking of tense, Dahl (1985:187) remarks about the past tense:

Given that e.g. PAST is very infrequently expressed by any other means than inflection, a language which does not in general have inflection will not be likely to have PAST as a major TMA category.

This contrasts with the future (1985:198):

...one category that comes close to being universally represented is FUTURE, which, however, scores lower on some other parameters of centrality, in being more often expressed peripherastically than e.g. PAST and being less often obligatory.

The presence of a future tense (morphological or syntactic) is a nearly unrestricted universal whereas the presence of a morphological past is closely bound to a language's use of inflectional morphology in general. If there is no inflection, there will probably be no category of past tense. As a corollary: if there is a past tense, it is likely to be marked inflectionally.

There is a universal of ordering for aspect, tense, and mood in that order from the verbal stem (Bybee 1985:196ff.):

**Verb-aspect-tense-mood
mood-tense-aspect-Verb**

This ordering universal can be explained as a corresponding ordering of word formation rules. It had only one exception in Bybee's 50 language sample, where a dubitative suffix precedes a preterite suffix in the Ojibwa verb. Another seeming

⁴Whereby it is clear that such universals can hardly be listed until the material worked with and the methods involved become better understood.

exception is in the ordering of pre-verbal elements in pidgin and creole languages:

ANTERIOR - IRREALIS - DURATIVE - VERB		
tense	mood	aspect

Similarly, in English, the ordering is:

TENSE - MODAL - PERFECT - PROGRESSIVE - VERB		
--	--	--

which also violates the proposed universal. This discrepancy can be eliminated by noting the difference between inflectional mood and agent-oriented modality. A tense marker may come about farther from the verb than a marker of agent-oriented modality (Bybee 1985:199), but tense will not occur farther from the verb than mood. This ordering principle may not be adequate for languages which combine different types of morphological marking (i.e. stem change, suffixation, prefixation), however, it presumably reflects a universal of ordering in the word formation rules which may apply material to lexically determined positions.

Tense is correlated semantically and pragmatically to mood and aspect (Chung & Timberlake 1985:206):

The different temporal locations of an event - past, present, and future - are inherently correlated with differences in mood and aspect. An event that will occur after the speech moment is non-actual and potential. Hence there is a correlation between future tense and non-actual potential mood and, by implication, between non-future tense and actual mood. An event that is ongoing at the speech moment has not been completed. Hence there is a correlation between present tense and incomplete (imperfective or progressive) aspect and, by implication, between past tense and completive (perfective or non-progressive) aspect. A consequence of these correlations is that temporal distinctions may be expressed by morphosyntactic categories that have wider modal or aspectual functions.

This relatedness of function to tense has led, e.g., Taylor (1989:149-154) to claim that the English subjunctive is in fact a secondary meaning of the past tense. He doesn't, however, account for such morphologically marked instances as

I was in the zoo.
If I were in the zoo.

where the form *were* is not equivalent to the past tense *was* and represents a formal subjunctive. Nonetheless, these correlations do come to bear on the possible origin and development of verbal categories.

The quantity of distinctions made between mood, aspect, and tense marking is related to several subcategories (Chung & Timberlake 1985:258). This is

motivated by the fact that tense and mood relate pairs of events in similar ways.
Graphically, the relevant patterns may be given:

More tense distinctions realis imperfective neutral aspect	$\Leftarrow \Rightarrow$	Fewer tense distinctions irrealis perfective perfect/progressive
More aspect distinctions past	$\Leftarrow \Rightarrow$	Fewer aspect distinctions present/future

4.0 The Indo-European Verbal System

4.1 Complex

The listing of verbal categories given in §2.0 is *per se* irrelevant for the reconstruction of Indo-European since one must reconstruct back from the formal material, not from types or systems. The sets of endings which can be reconstructed from the daughter languages by the comparative method are (Szemerényi 1990):

Set A: a. Gk. Skt. active present vs. b. aorist/optative

	a.	b.
sg.	1. -mi	-m
	2. -si	-s
	3. -ti	-t
pl.	4. -nti	-nt

Set B: a. Gk. Skt. middle present, Gothic passive vs. b. Gk. Skt. aorist/optative middle

	a.	b.
sg.	1. -ai/-mai	-a/-ma
	2. -soi	-so
	3. -toi	-to
pl.	1. -med ^h a(-a?)	-med ^h a(-a?)
	2. -d ^h we	-d ^h we
	3. -ntoi	-nto

Set C: Gk. Skt. Perfect/Hittite present/Germanic preterite

sg.	1. -a	or: -h ₂ e
	2. -tha [must be laryngeal because no t ^h !!]	or: -th ₂ e
	3. -e	
pl.	1. -me	
	2. ?	
	3. -r(o)	

These endings as lexical material are generally agreed upon. Their distribution in the daughter languages is more complex than the few notes given for each set imply. They are conventionally labeled:

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Set A = Active endings in present/aorist system:

primary with -i	present
secondary without -i	aorist/optative

Set B = Medium in present/aorist system:

primary with -i diphthong	present
secondary	aorist/optative

Set C = Perfect

The comparative analysis of the verb also takes principles of stem formation into account. The conventional three labels are:

present-aorist-perfect stems

Mood is defined and labeled from comparative reconstruction of specific suffixes.

Up to this point, the reconstruction is abstractionist/formulaic. The interpretation (as opposed to labeling) of these patterns is a different enterprise as is the internal reconstruction of earlier stages. A possible interpretation which is close to Greek and Indo-Iranian is (Szemerényi 1990:245ff.):

Voice:

Active
Medium

Mood:

Indicative
Subjunctive
Optative
Imperative

Tempora:

Present
Aorist
Perfect

This category "tempora" actually includes tense and aspect and can be broken down:

Tense:

Absolute tense:

present ("Present")

Relative tense:

present perfect ("Perfect")⁵

Aspect:

⁵Krahe (1972:122) calls the perfect an aspectual category. In fact, the nature of this relative tense, i.e., a past event locus in relation to a present tense locus, means that it is used pragmatically to refer to events whose occurrence anterior to the present means they have been completed. This makes the perfect common to refer to states.

- | | |
|--------------|-------------|
| imperfective | ("Present") |
| perfective: | ("Aorist") |

By this analysis, the "Present" forms are unmarked for tense and for aspect (i.e. imperfective present). The "Perfect" is an unmarked relative tense (i.e. present) and semantically "perfective" but unmarked for aspect. The "Aorist" is unmarked for tense but marked for aspect.

4.1.1 Typological Evaluation

Voice: No violation of stated universals.

Tense: Of the markedness patterns listed under §3.1, none are violated. That the preterite is more marked than the present but less marked than the future makes the lack of a future in word formation rules more plausible. On the other hand, the strong statistical universal that a future will be expressed seems violated. This violation is, however, only apparent, as a paraphrastic (i.e. syntactically constructed) or lexical future is quite common. There can be little doubt that the Indo-Europeans were adequately able to refer to the future. The universal that past tense be expressed morphologically is not violated since a converse of the universal is not valid; i.e. a language which does not have inflection may be unlikely to have PAST as a major TMA category, but a language which does have inflection does not necessarily have a preterite. Finally, that the reconstructed system has only present tense as an explicit category in the morphology violates a weak universal that there is usually a future vs. non-future or a past vs. non-past. This violation does not allow a modification of the reconstruction. However, it does come to bear on the development patterns in the daughter languages (cf. §5.0).

Mood: No violations of the stated universals which only claim that the indicative (unmarked) is always present if there is any hypothetical mood.

Aspect: No violations of the stated universals. The split of perfective/imperfective belongs to one of the most commonly expressed morphological categories.

Intercategorial Relationships: Under the given interpretation, the categories of person and number are expressed in the morphology with word formation rules. This violates a markedness inflectional hierarchy that person/number are more marked than TMA. As was noted, tense seems to be unmarked.

In terms of ordering of markers, as tense is not marked, one expects the pattern:

Verb-aspect-mood
mood-aspect-Verb

Because aspectual distinctions are marked on the stem of the verb whereas mood is suffixal, the ordering pattern is not violated.

In sum, the reconstructed system (which is close to Greek and Indo-Iranian anyway) appears not to violate synchronic universals. If it is nonetheless rejected by many, it must be for other reasons.

4.2 Simple

Hittite has two categories of verbal conjugation in the present, the *hi-* and the *mi-*conjugations, named after the ending of the first singular present. The endings of the *mi-*conjugation fit easily to forms attested in other languages for the same function.

Hittite	Sanskrit	Greek
-mi	-mi	-mi
-si	-si	-si
-zi	-ti	-ti

However, the *hi*-endings are formally related to what is the perfect conjugation in Greek, Indo-Iranian, and traditional Indo-European:

Hittite	Sanskrit	Greek	IE	or	IE ⁶
-hi	-a	- α	-a		-h ₂ e
-ti	-tha	-θ α	-θa		-th ₂ e
-i	-a	-e	-e		-e

The traditional Indo-European perfect also is reflected by a Germanic preterite.

We are left with the pattern of correspondences:

present-perfect-preterite

To explain this formal identity but functional difference, stage developments have been proposed and a reconstruction which differs greatly from the traditional one given above (§4.0). Neu (1976) proposes a two stage reconstruction of the proto-language with *Indogermanisch* and *Frühindogermanisch*. *Frühindogermanisch* had a relatively simple verbal system with two voices (active, middle), two tempora (present, non-present). Hittite left the language group at a stage where there was still no opposition of preterite/mood and changed only in a reinterpretation of an original perfect or medio-perfect into what became the *hi*-present and preterite conjugation (1976:253). Neu believes it methodologically unsound to assume the verbal differentiations of Sanskrit and Greek in Indo-European. He traces the *hi*-presents to a medio-perfect in the proto-language (cf. Lehmann 1987:29). Neu later points out that mood formations in Indo-European are synthetic and thus innovative (1988:464). The formation in

⁶Endings without laryngeals according to Szemerényi (1990:259); endings with laryngeals following Beekes (1990:282).

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-*ō* for the 1st sg. is also post-*Ausgliederung* of Hittite (1988:465). Neu gives his two-stage reconstruction the following appearance (1985:283ff.):

INIUNCTIVUS			
	ACTIVUM		PERFECTUM
	(active form)		(stative form)
sg.	1. *-m		*Ho (*-h₂o)
	2. *-s		*-th₂o (*-th₂o)
	3. *-t		*-o
pl.	3. *-nt		*-or
↓			
INDICATIVUS			
	ACTIVUM		PERFECTUM
	(active form)		(stative form)
sg.	present	non-present	present
	1. *-m-i	*-m	*-Ha (*-h₂a) *-Ho (*-h₂o)
	2. *-s-i	*-s	*-th₂a (*-th₂a) *-th₂o (*-th₂o)
pl.	3. *-t-i	*-t	*-e *-o
	3. *-nt-i	*-nt	*-Vr *-or

Or more schematically:

Stage I	Stage II
Voice:	Voice:
Active	Active
Stative	Stative
Mood:	Mood:
Indicative	Indicative
Tense:	Tense:
Absolute tense:	Absolute tense:
Present	Present
Aspect:	Aspect:
Imperfective ⁷	Imperfective

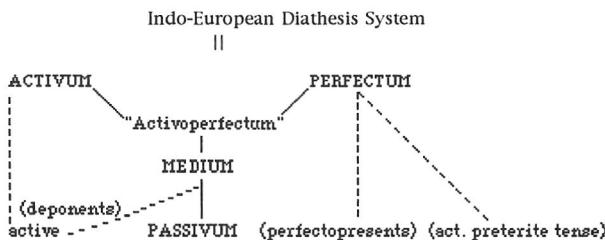
The derivation of marked present forms from unmarked forms whereby the unmarked forms come to denote "non-present" seems to run counter to hierarchical markedness universals. The marking "non-present" runs counter to a universal that there are past vs. non-past markings or future vs. non-future, but not present vs. non-present. A non-present can be either anterior or posterior to present but not both. Finally, if a tense marking is likely to develop, it will be the preterite, as given here.

⁷Whereby the stative is semantically perfective in aspect.

Neu further gives the following reconstruction of the primary and secondary endings of the middle for at least an areal distribution among Indo-European languages (1985:286):

	Primary	Secondary
sg.	1. *-(m)-a-i 2. *-s-a-i (*-s-o-i?) 3. *-(t)-a-i (*-(t)-o-i?)	(Gk. -μᾶν, Indic -i) *-s-o *-t-o
pl.	3. *-nt-a-i (*-nt-o-i?)	*-nt-o

He claims that the *hi*-endings do not go back directly to the older stative-perfect but instead to the morphological prototype of the later primary and secondary middle endings (1985:289-290). If this reconstruction is accepted with its *a*-vocalism in the primary endings and *o*-vocalism in the secondary endings, it is reminiscent of the perfect formations in Stage II and fits in with the semantically and pragmatically related functions of passives and perfects. Neu's (1985:294) summary of the development of diathesis looks like this:



4.2.1 Evaluation

By this active/stative division, a definition has been met for a more holistic language type, namely the active-stative languages discussed in Chapter 6, §3.2. The "conceptual cast" of verbal semantics make this reconstruction tempting. However, Nichols (1992) shows that the stative-active type is not as polythetic as one would like. The characteristics which clearly correlate with this alignment are:

- 2.) Grammatical differentiation of verbs into active/stative according to their semantics
- 3.) Prominence of affective verbs and verbs of experience.
- 6.) Polysynthetic expression of syntactic relations incorporated into the verbal form.
- 7.) Complementary distribution of alienable vs. inalienable possession.

Nos. 2 and 3 are definitional. The rich nominal morphology violates the pattern of head marking called for in No. 6 unless the rich nominal morphology which can be reconstructed is discounted or claimed only for a late stage of the language. Finally, the alignment of a language is claimed to be genetically stable, yet the daughter languages seem not to have preserved an active-stative alignment. These problems with a stative-active reconstruction do not imply that the above analysis can be rejected, they only show a few weak points and that even if the definition of a stative-active language is met, it may not have that many real implicational patterns associated with it that would allow further reconstruction.

5.0 Development of Indo-European Verbal Categories

5.1 Complex System

In the following, I am taking the morphologically complex version of the Indo-European verbal system and noting the proposed syncretism or loss of categories in relation to the formal marking that it assumes in some of the daughter languages. This involves an interpretation of verbal systems for the daughter languages which are not all that clear themselves (cf. Binnick 1991 for a history and description of the problem). Functional shifts within a category are given in italics, innovations underlined, loss of categories in bold, shift or merger with a different category with: *shift: new function*. After some categories the label used in grammars of the respective language are given in quotation marks.

1.) Latin

Voice:

Active	active
Medium	<i>passive</i>

Mood:

Indicative	indicative
Subjunctive	<i>subjunctive; shift: future</i>
Optative	lost
Imperative	imperative

Tense:

Absolute tense:

Present	present <u>preterite</u> "imperfect" <u>future</u>
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Relative tense:

Present perfect	present perfect "perfect" ⁸ <u>past perfect</u> <u>future perfect</u>
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Aspect:

Imperfective	(imperfective)
Perfective	<i>shift: present perfect</i>

⁸The Latin perfect uses the IE "middle" endings, reflecting the similar pragmatics of perfects and passives.

Latin has expanded its tense system by innovating to a three way pattern of absolute tense and a two way system of relative tense. The medium is now passive. The inventory of moods is reduced although formal traces of the optative survive in a few verbs as subjunctive. Aspectual distinctions are no specifically longer marked in the morphology.

2.) Gothic

Voice:

Active	active
Medium	<i>passive</i>

Mood:

Indicative	indicative
Subjunctive	lost
Optative	shift: subjunctive
Imperative	imperative

Tense:

Absolute tense:	
present	present <u>preterite</u>

Relative tense:	
present perfect	shift: preterite

Aspect:

Imperfective	imperfective
perfective	lost [only paraphrastic perfective]

Gothic has undergone a loss and shifting of categories. The medium is maintained as the passive (not in other Germanic languages which develop new passive constructions, North Germanic - morphological, West Germanic - syntactic). The mood system becomes smaller with the subjunctive lost and the optative taking over its functions. In contrast to the proto-language, the older relative tense system has been reinterpreted into preterite and been supplemented by the dental preterite in weak verbs. Aspect is unmarked imperfective morphologically but can be marked with *ga-* clitic as perfective.

3.) Celtic (Irish)

Voice:

Active	active
Medium	<i>passive</i>

Mood:

Indicative	indicative
Subjunctive	subjunctive
Optative	shift: subjunctive
	<u>conditional</u> (cf. "secondary future")

Imperative	imperative
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Tense:

Absolute tense:	
present	present <u>preterite</u> "imperfect/iterative preterite"

		<u>future</u>
Relative tense:		
	present perfect	shift: perfective "secondary future/conditional"?
Aspect:		
	Imperfective	imperfective
	Perfective	perfective "simple preterite"

In Irish, an expansion of the tense system corresponds to a loss of relative tense and a maintenance of aspectual distinctions in the past (which is where they are most likely). The status of the "secondary future" is not as clear. Thurneysen (1946:332) describes it as referring to "an action which, when viewed from a definite point of past time, lay in the future..." or "with no temporal limitation, to indicate that under certain conditions something could occur (potential), or - still more frequently - that something would, should, or could happen...or have happened under certain conditions..." The first meaning would appear to be a three locus relative tense with a posterior event locus related to a tense locus which is anterior to the speech moment:

tense locus event locus speech moment

The conditional has also been interpreted as a mood (cf. Binnick 1991:129). If this is so, then Irish lost all relative tense.

4.) Indic

Voice:

Active	active
Medium	medium
	<u>passive</u>

Mood:

Indicative	indicative
Subjunctive	subjunctive
Optative	optative
Imperative	imperative
	<u>injunctive</u>
	<u>conditional</u> ⁹

Tense:

Absolute tense:	
	present
	<u>present</u>
	<u>preterite</u> "imperfect"
	<u>future</u>

Relative tense:

present perfect	present perfect
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Aspect:

Imperfective	imperfective
Perfective	perfective "aorist"

⁹Cf. Thumb (1930:282).

Indic has developed a "maximum" system with expansion of absolute tense to a three way system. Voice has also split into a three way system. It has maintained aspectual marking and moods but the modal system has expanded. By the end of the Brāhmaṇa period, perfect and imperfect had fallen together as well as aorist and imperfect. The subjunctive is lost in Classical Sanskrit and the optative takes over its functions.

5.) Greek

Voice:

Active	active
Medium	medium

Mood:

Indicative	indicative
Subjunctive	subjunctive
Optative	optative
Imperative	imperative

Tense:

Absolute tense:

Present	present
	<u>preterite</u>
	<u>future</u>

Relative tense:

Present perfect	present perfect
	<u>past perfect</u>
	<u>future perfect</u>

Aspect:

Imperfective	imperfective
Perfective	perfective

Greek has a "maximum" system. It has developed a three way tense system for absolute and relative tense, maintained full moods, aspectual distinctions, and added a passive.

6.) Armenian

Voice:

Active	active
Medium	medium

Mood:

Indicative	indicative
Subjunctive	subjunctive
Optative	
Imperative	imperative/injunctive

Tense:

Absolute tense:

Present	present
	<u>preterite</u>

Relative tense:	
	Present perfect
Aspect:	
Imperfective	imperfective

Perfective	perfective
------------	------------

According to Schmitt (1981:133), most of the formal markers are not clearly relatable to Indo-European (cf. Klingenschmitt 1982). This sketch has left out reference to etymology, only depicting the inventory of categories. As with Germanic etc., Armenian has added a preterite marking and lost relative tense, but it has maintained aspectual morphological marking.

7.) Hittite

Voice:	
Active	active
Medium	medio-passive
Mood:	
Indicative	indicative
Subjunctive	<i>lost</i>
Optative	<i>lost</i>
Imperative	imperative
Tense:	
Absolute tense:	
Present	present <u>preterite</u> "imperfect"
Relative tense:	
Present perfect	shift: present
Aspect:	
Imperfective	imperfective (unmarked)
Perfective	<i>lost</i>

Hittite has the most radically different system of the languages here noted. Here, only the slots marked *lost* or **shift** represent explicit etymological connections. The exact fate of each formal marker and category is moot if one takes the complex Indo-European reconstruction and a more explicit description awaits the appearance of a Hittite historical grammar.¹⁰ The only shift which is very different in pattern from those in the other languages is that of the present perfect relative tense to a present tense in complementary distribution and identical semantics to the *mi*-present (cf. below §5.2).

¹⁰Here my criticism of the sociology of the field (preface) is particularly appropriate. One sees constantly the statements of Anatolianists that this or that approach is mistaken, being based on J. Friedrich's out of date grammar (1960). Yet, no complete new grammar has been forthcoming. Of course, a grammar written today would also become out of date as more texts are interpreted, but it would fulfill the needs of a great many non-Anatolianists (cf. Cowgill 1986:18).

To sum up: For the above daughter languages, developments of voice range from expansion to a three way system to maintenance of a two way system. That, e.g., Gothic has a passive instead of a middle probably only reflects a difference in label. Comparatively speaking, the Indo-European medium could as well be called a medio-passive or even a simple passive. There is little increase of modal categories (except Indic). The hypothetical moods are simplified, sometimes the formal optative taking over, sometimes the formal subjunctive. The aorist is most likely to be lost or combined with the perfect. Most notable is the increase in tense categories. All of these languages add preterite marking to the verbal morphology either by innovation or shift of markers from a previously distinct category. This is in agreement with the statistical probability that if a tense is marked morphologically it will be the preterite. There are no violations of the universals stated. The close relationship of future/mood is reflected in the development of future tenses.

5.2 Simple

The interpretation of Indo-European verbal categories which is typified by Neu (1985) must develop into the same systems which were given above. Rather than list these systems again, some of the major changes proposed will be given and evaluated.

There is a uniform change from active:stative voice to active:passive or active:medium:passive. In this, the formal stative changes to a passive or medium. This change is semantically and pragmatically well motivated (cf. §4.1). Mood is increased. Tense distinctions are extended in all languages and according to the model already present in Stage II. Aspect is not marked morphologically, rather it develops in the later languages. Relative tense is not originally marked, however, the stative voice makes relative tense somewhat redundant.

The specific development which has certainly drawn the most attention is that of the formal cognates of the Hittite *hi*-conjugation. Recall from Chapter 6, §3.1 the motivated diachronic universals:

- | | | |
|--------------------------|---|--------------------|
| 1.) passive | → | perfect/past |
| 2.) possessive | → | perfect/past |
| 3.) nominative + passive | → | ergative + perfect |

Conceivably, a passive or stative developed into the Greek/Indo-Iranian perfect while in Germanic it shifted to preterite, and in Hittite it progressed from a perfect via an intermediary stage with ergativity to a present.¹¹ A new medium/passive is then innovated in the various languages, often using some of the same formal material which is in the perfective.

¹¹This Hittite development strikes me as interesting, however, I presently have no resources to check it up with. Accordingly, it is pure speculation.

6.0 Stage Models of Indo-European

The pattern discussed in §4.2 and §5.2 is taken as part of the basis of an extensive stage model of Indo-European and related to the problem of *Ausgliederung* (cf. Cowgill 1974, 1979; Meid 1975, 1979; Neu 1976 etc.; Schmid 1979:234; Adrados 1982 etc; Polomé 1982a; Tischler 1982). Adrados (1992), for example, works with a three stage model of Indo-European which he relates to the spatial distribution and dispersion of the Indo-European speakers (1987a):

- Stage I: non-inflectional
- Stage II: binary oppositions and like Hittite
- Stage III: rich inflection

Stage I Indo-European is non-inflectional, Stage II is typified by binary oppositions in the morphology and represented most closely by Hittite, Stage III is the richly inflected language which gave rise to Greek and Indo-Iranian. Adrados (1987b) expounds on the binarism of Hittite and projects this onto a general mentalistic framework which seems less credible, especially considering the large number of languages which show no trace of such binary strictures in the setup of the morphological categories (cf. Schlerath 1981:195).

Support for the more traditional system is strong (Hoffmann 1970:41; Eichner 1975; Risch 1975, 1985; Schlerath 1981 etc.). Arguments range from methodological: Abstractionism vs. Realism, applicability of internal reconstruction to a proto-language; to material: traces of maximum system claimed for Anatolian (Eichner 1975:71-72; criticism of this by Neu 1976:244-245). Rosenkranz' claim that since Hittite is archaic in its nominal morphology and syntax the archaic verbal system is plausible assumes an unproved relationship among these categories' conservatism (1979:20).

In terms of the typological methods here discussed, little can be said about the stage models. The diachronic developments proposed for Stage II and III are motivated, but so are those of the traditional model. The reconstruction of a Stage I is purely speculative since patterns of grammaticalization cannot be defined clearly and provably to get from a non-inflectional system to the kind of morphology which the comparative method produces (cf. Schlerath 1987b:45). Non-inflectional Indo-European may be a consequence of the reductionism inherent in extensive reconstruction for a great time depth. Of the views on *Ausgliederung* given above in §2.0, none can be discounted on the basis of the typological arguments alone. The simple reconstruction with its differing developments of the passive/middle and perfect categories does support the interpretation of Hittite leaving the Indo-European fold earlier than some of the other languages but not so early that its verbal system can be totally discounted. Germanic is close enough to the traditional reconstruction that its resemblance to Hittite in its verbal categories can reasonably be ascribed to loss unless it be shown that the two language groups have not just similar systems of categories

but also formal agreement in the expression of this reduced system of categories.¹²

7.0 Conclusions

In looking at the inventory of Indo-European word formation rules for the verb, the following problems for any reconstruction have emerged:

- 1.) Archaicity or innovation in Hittite vs. Greek/Indic
- 2.) Violations of hierarchical universals of tense marking

The first problem may be explained through internal reconstruction of a prior system where the perfect was a passive or middle construction. As was demonstrated, a passive can easily develop into a perfect (and show accompanying ergative nominal marking). This scenario of development is supported by the analysis of the Hittite *hi*-conjugation's endings. Thus the first point is tentatively answered that Hittite has innovated to a large degree by losing word formation rules. The question is, however, not answered as to just how much has been lost, nor as to the ultimate status of verbal morphology in Greek/Indic. The precise relationship of the of person/number marking to TMA marking needs to be better understood. As it stands, the clear marking of person and number in Indo-European is an argument for a similarly differentiating inflectional marking of TMA. Finally, the proposed developments from a traditional system fit easily within the patterns of probability here given, esp. in the almost universal innovation of a preterite tense.

A better understanding of chronological layering in each of the languages is needed and stage models need to be better worked out as "synchronic" systems (e.g., the precise distinctions and distributions of tense and aspect) and in their holistic developments. As in general with diachronic universals, there is far too little material available on their statistical strength. A needed research project would be the compilation and cataloging of these universals so that their relative strength could be better integrated into evaluations of proto-languages.

¹²Note that this has been shown to a certain extent. For example, Polomé 1964 shows that the aorist may not be reconstructible for any pre-stage of Germanic; and Drinka 1988, 1990 questions the reconstructibility of an Indo-European aorist at all. If so, then the protolanguage may have only marked present tense, present perfect relative tense, and imperfect aspect. However, the hierarchically more marked categories could easily have been expressed in the syntax.

Concluding Note

In the reconstruction of a proto-language, the product will always reflect the quality and quantity of the data available. The most important contribution of typology to the reconstruction of Proto-Indo-European is to define more clearly the degrees of probability of one reconstruction over another. Just as has been seen again and again, alternative reconstructions must be judged on a scale of relative probability and plausibility. The higher the degree of typological strength and consistency, the stronger the applicability of typological findings to a reconstruction. Conversely, the more abstract and the weaker a typological correspondence, the less useful it becomes as a tool in reconstruction. These findings are reflected in the progression of chapters in this study. Phonology is the strongest area of typological consistency and strength and it is here that typological findings are most useful. In the analysis of nominal and verbal morphology, I found that the typological arguments were weaker but still illuminating.

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Note on Conventions of Transcriptions

$x > y$ or $x \rightarrow y$ indicates that form x is ancestral to form y .

$x \supset y$ indicates that form x implies the presence of feature y , or that form x is more marked than form y .

- * before a form indicates that it is a reconstruction.
- T represents any obstruent.
- V represents any vowel.
- H represents any laryngeal.
- R represents any resonant.
- C represents any consonant.
- o subscripted under any symbol indicates syllacticity.
- T' indicates glottalization of the obstruent in question.

I have chosen not to transcribe Greek or Slavic from their original alphabets. In transcribing Hittite I use *h* and *s* without redundant diacritics.

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